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TASK FORCE TO STUDY THE ECONOMIC DEVELOPMENT OF THE MARYLAND SEAFOOD AND AQUACULTURE INDUSTRIES

Report to:

Governor Robert L. Ehrlich, Jr.

Senate Education, Health and Environmental Affairs Committee

House Economic Matters Committee and

House Environmental Matters Committee

November 10, 2004

Submitted by Senator Katherine Klausmeier, Chairperson
And Members of the Task Force

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The Senate of Maryland

ANNAPOLIS, MARYLAND 21401-1991

The Honorable Robert L. Ehrlich, Jr.
State House
Annapolis, MD 21401

November 10, 2004

Dear Governor Ehrlich:

Under Ch. 535 of the Acts of 2002 (House Bill 662), which passed unanimously in each chamber, the Task Force to Study the Economic Development of the Maryland Seafood and Aquaculture Industries was enacted. The bill created two workgroups: the seafood industry workgroup with 21 members, and the aquaculture industry workgroup with 19 members. Jointly these workgroups were charged with more than a dozen areas of inquiry. Since the summer of 2002, the task force has met regularly to grapple with the several complicated issues associated with the development of these industries in Maryland. Likewise, each workgroup and each workgroup subcommittee has met frequently.

Like most task forces, we have invested substantial time and energy in the mission entrusted to us by the General Assembly. What is most remarkable in this case, however, is that all seafood-aquaculture interest groups have had a seat at the table. Therefore, we have done more than labor long and hard. We have labored long and hard together. We have listened to a variety of stakeholders, we have delved into the "how" and "why" of obstacles currently limiting the success of our seafood and aquaculture industries, we have researched how other states resolve these issues, and we have formulated seafood and aquaculture plans that we believe can only stabilize and enhance these Maryland industries.

Have we resolved all of the underlying problems or even all of our own individual differences? Have we accomplished all that needs to be done? No, not yet. Given the variety and complexity of these industries, however, we have taken significant strides forward, and the work of this Task Force has laid a firm foundation for the additional work that needs to be done.

I am, therefore, very proud of the findings, recommendations, and legislative proposal contained in the reports submitted herein. I am likewise most grateful for the unstinting commitment of the Task Force members, particularly the workgroup and subcommittee chairs, and the staff who have made it all come together. It has been an honor and a pleasure to lead this group.

Respectfully submitted,

Kathy Klausmeier

Senator Katherine Klausmeier
Chair, Task Force to Study the Economic Development
of the Maryland Seafood and Aquaculture Industries

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SEAFOOD WORK GROUP REPORT AND RECOMENDATIONS

Executive Committee of the Seafood Work Group

William R. Woodfield, Chairperson, Chesapeake Bay Seafood Industries Association

Senator Roy P. Dyson
Thomas Rippen, University of Maryland Sea Grant Extension Program
Jay Newcomb, A.E. Phillips Company

Seafood Work Group Report

The Maryland seafood industry is facing many challenges including competition from imports, reduction in work force, limitations on harvesting due to governmental restrictions and natural forces in a resource-based industry. It is estimated that by 2020, 79% of all seafood consumed in the United States will be imported. Maryland harvesters and processors face strong competition from products that are similar to imports that are able to reach the market at a much reduced cost. These imports affect the following wild products: catfish, crab meat, soft shell crabs, oysters and possibility of other finfish.

These issues and challenges were the driving force behind the work and recommendations of the Seafood Work Group of the Task Force to Study the Economic Development of the Maryland Seafood and Aquaculture Industries.

The Seafood Work Group was comprised of 21 members consisting of the following groups: two members of the House of Delegates, two members of the Senate, a representative of the Departments of Agriculture, Natural Resources, Environment, Health and Mental Hygiene, and Business and Economic Development, three representatives of the University of Maryland, two representatives of the Maryland Watermen's Association, two representatives of the Chesapeake Bay Seafood Industries Association, and representatives of; the Restaurant Association of Maryland, Food Dealers Council of Maryland, Maryland Aquaculture Association, seafood processing industry and seafood value-added food manufacturing industry.

The Seafood Work Group was charged with the following tasks:

* Study and develop methods of expanding local and national markets for Maryland seafood;

* Explore whether existing seafood marketing techniques are being fully utilized by the industry and, if not, what is needed to increase the utilization of these techniques;

* Study and develop innovative seafood processing techniques;

* Review the methods other states have implemented to develop their seafood industries;

* Consider and include as appropriate in its report the findings of any other task force or work group engaged in a study that impacts in economic development of the seafood industry; and

* Review and evaluate legislative and regulatory and permitting procedures to facilitate sustainable development of the industry.

The seafood work group looked closely at these tasks and placed them into three sections: marketing, innovative seafood processing techniques and legislative and

regulatory and permitting procedures to facilitate sustainable development of the seafood industry.

Section I: Marketing

The Seafood work group developed a vision for the Maryland seafood industry which reads, "A prosperous seafood industry that provides high quality seafood products commercially caught, grown, processed, or sold in the state of Maryland while maintaining sustainable resources and contributing to employment and economic development."

Goals:

1) Increase the total value of the seafood industry to the state of Maryland.
2) Facilitate the expansion and profitability of seafood companies in Maryland.

Strategies:

1) Develop a collaborative effort among all state agencies involved in the regulation, research, development or promotion of seafood to eliminate and/or reduce road blocks to the growth of the Maryland seafood and aquaculture industries.
2) The Aquaculture Development and Seafood Marketing Program acts as a seafood marketing board similar to the Virginia Marine Products Board, Louisiana Seafood Promotion & Marketing Board or Florida Bureau of Seafood and Aquaculture Marketing. The marketing program should act as an independent commodity group with a bold and innovative marketing campaign that would support industry development, trade market development, and new product development and stimulate consumer demand.
3) The Program should have adequate funding and staffing.

Recommendations: After studying the seafood marketing programs of five states; Louisiana, Virginia, Alaska, Maine, and Florida, and evaluating the current seafood program of the Maryland Department of Agriculture several specific recommendations were made including increased funding and staffing. These recommendations include:

1) The placement of the Aquaculture Development and Seafood Marketing Program directly under the authority of the Deputy Secretary of Agriculture. Presently, the Program is under the Assistant Secretary for Marketing, Animal Industries and Consumer Services. This would give the Program higher visibility and more importance within the Department and among sister state agencies. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

2) The Department of Agriculture's International Marketing Program currently has the responsibility of international marketing of Maryland seafood. It is the recommendation of this Task Force to transfer the responsibility of marketing Maryland seafood products internationally to the Seafood Marketing Program provided that the recommended increased staffing and funding is provided. If Seafood Marketing is charged with the responsibility of international marketing of Maryland seafood, new and innovative eye-catching seafood literature on all Maryland seafood products should be developed in other languages such as: Japanese, Chinese, Spanish, etc. The Seafood Marketing Program will penetrate new markets for seafood by participating in major EU and Pacific Rim seafood trade shows to assist Maryland seafood companies in these markets. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

Funding: $50,000.

3) Present staff should be increased by three seafood marketing specialists. These employees should be knowledgeable about the seafood industry, market development, media relations and special events, one of these specialists will work closely with the Maryland seafood industry in the development and evaluation of new products, processes and procedures that meet commercial buyer requirements and increase profitability and analyze the economic impact of the seafood industry to the state of Maryland.

Funding requirements would be approximately $270,000 including salaries, benefits, and operating expenses.

4) There should be a contingency fund to disseminate local and national information of a positive and unbiased nature to mitigate impact to Maryland's seafood industry from national or global fish and seafood news or publicity. News stories, which include contamination, environmental catastrophes, or any news item or event, may scare or discourage people from consuming Maryland seafood even though the adverse impact is elsewhere in the nation or the world.

Funding of $30,000 for news releases, public relations, advertising or printed material development.

5) The Program needs to update all present literature and point of sales material including recipe brochures, fact sheets, availability charts, nutrition and safety information to include new logo, web site information and updated information. Literature is disseminated to wholesalers, retailers and consumers.

Funding: $50,000.

6) An independent web site should be developed and maintained to benefit all seafood and aquaculture companies in the state of Maryland. The web site will include current market information, retail and wholesale information, regulation and safety information and consumer news. The site will include links to seafood companies. This will enable us more control of web site content and will make finding the Program's site on the web easier and faster.

Funding: $20,000 for development and maintenance of the web site for the initial year and $5,000 per year thereafter.

7) The Program should contract for market research to determine marketing strategies. The research projects should be conducted on a rotating basis for example; consumer's attitudes every four to five years and sales research every two to three years.

a) Research consumer's attitudes about Maryland seafood to include information about their knowledge of Maryland species, opinions on taste, quality, availability, safety, packaging, convenience and consumption type and amounts.
b) Research where Maryland seafood is sold: in-state, other states, retail, wholesale, processors or direct to consumers.

Funding: $25,000 annually

8) Expand the area in which we place advertisements based on results of market research. Currently, most of our newspaper ads are placed in the Baltimore Sun and sometimes in smaller county or neighborhood papers. Market research may indicate that the Program should expand advertising into other markets such as Philadelphia, New Jersey, Delaware, and Northern Virginia or place in national or regional trade publications targeted for the retail or wholesale seafood buyer.

Funding will be re-directed from current budget appropriation.

9) Develop marketing programs to include African, Asian, and Hispanic markets. These growing population groups historically use a higher percentage of seafood in their diets. Recipes should be developed for consumers and foodservice using ethnically traditional methods of preparation and ingredients incorporating Maryland seafood. Advertising and news releases should be placed in ethnic-targeted newspapers.

Funding: $25,000.

10) Promote the nutritional benefits of seafood. Update nutrition chart to include omega-3 fatty acid information. Develop news release for National Nutrition Month in March.

Funding is included in current budget appropriation.

11) Develop target city promotions to introduce new buyers to Maryland seafood products. The target cities would be selected from the market research. The promotions would bring Maryland seafood product and their producers to the seafood buyers.

Funding: $30,000.

12 Participation in additional regional and/or national trade shows determined by market research.

Funding: $20,000.

13) The marketing sub-group endorses national protocols as defined by the National Shellfish Sanitation Program that insures a safe product in the market place.

14) Recommend that the State; ensure a workforce that will meet the needs of the industry. Currently a large percentage of the seafood industry uses H2B visa (seasonal) workers. Because of demand across the country, the current quotas are being filled before the Maryland seafood industry can apply to get their guest workers. This is a federal issue that is vitally important to the Maryland seafood industry and an increase in the quota cap would be of great assistance. It is therefore recommended that the State support federal reform of the H2B program.

Total funding requested for the improvement of marketing Maryland seafood products both domestically and internationally: $520,000 for the first year and $505,000 per year thereafter.

Section II: Innovative Seafood Processing Techniques

A New Opportunity

Maryland's state government commitment to the seafood industry has declined over the past 30 years. The state-funded Marine Products Laboratory in Crisfield was nationally recognized for its work with commercial process development and seafood safety issues. The large number of small seafood businesses in the state drew heavily on this support as product quality, packaging, and health concerns were successfully addressed. Established in 1950, it was closed some 35 years later; a casualty of budget cuts. When the Marine Products Lab was closed, some functions were transferred to the Horn Point Laboratory (University of Maryland Center for Environmental Science). However, by the early 1990's the remnants of support for the industry were lost entirely after several faculty retirements and a redirection in programming.

Fortunately, significant seafood processing and safety expertise is available within the University System of Maryland, including a new Food Science Ph.D. program and state-of-the-art facility at the University of Maryland Eastern Shore. This program is attracting outstanding faculty in food research, teaching and Extension. The Maryland Sea Grant Program and the Maryland Department of Agriculture, Seafood Marketing Program, continue to work closely with seafood industry partners to enhance economic opportunities in an increasingly competitive business environment.

The Challenge

The Maryland seafood industry is composed of numerous, small, independently operated companies; nearly all of which lack facilities or expertise in product and process development. Most are poorly positioned to adapt to changing markets and seafood supplies. Over the past ten years, the number of crab processing plants operating in Maryland has declined by 47 percent and the number of working oyster plants by approximately 40 percent. The effect on coastal communities is especially extensive in towns where, historically, the seafood industry was the major employer. In some areas, it still is. Despite these setbacks, the potential for a viable industry in Maryland remains

strong. While some fishery stocks are in decline, others are recovering. A long-term commitment to the industry and to the health of marine resources is needed.

Several years ago, the National Sea Grant Program assembled teams to evaluate needs related to marine research and outreach. Seafood Science and Technology was one of the ten thematic areas evaluated. A national team of approximately 30 experts from the seafood industry, academia and government assembled in New Orleans for two days to identify causes and most promising solutions to the many factors impeding the sustainability and growth of the domestic seafood industry. These issues were evaluated further over a period of two years and summarized in a white paper entitled, "Ensuring Global Competitiveness of the U.S. Seafood Industry".

Most major impediments identified in the white paper apply to the Maryland industry. The team recognized;

> "... an increasingly competitive global marketplace, complex trade policies, stricter safety regulations, rising energy costs, food security concerns and an increasingly limited seafood supply. Change also brings new opportunities to expand markets, form strategic alliances and encourage innovations to lower production costs, create new products, add value to existing ones, increase safety and reduce waste. In this new seafood era, science and education are cornerstones for maintaining the vitality of the nation's $27 billion seafood industry ($55 billion including consumer expenditures) and its 250,000-member workforce. To remain competitive, the industry must control the costs of catching, transporting, processing, storing and distributing seafood. The U. S. seafood industry recognizes the benefits of innovation, but it is comprised of mostly small and medium-sized, independent enterprises that simply cannot afford research and development programs." They went on to say, "To remain competitive, the industry needs to improve its use of innovative processing technologies... Improvements are also required in many conventional technologies..."

Our Seafood Task Force section concurs with national Sea Grant on many points. We determined that quality concerns and the near absence of technology are major competitive disadvantages for our industry. Most food companies generate up to half of their profits from products that have been on the market for less than five years. Yet, most seafood products are processed and marketed today much as they were 40 years ago. Innovative processing, packaging and marketing strategies are needed to improve product quality, control costs and meet changing customer requirements. Demonstration projects with industry (primary and secondary processing, use of convenience packaging, etc.) are necessary to support adoption of technologies, improve margins and expand markets. Key to success will be the active involvement of processors and seafood industry suppliers, with technical and marketing support from Maryland universities and agencies.

Research priorities identified by industry

Based on informal discussions with industry and academic advisors, the Innovative Seafood Technologies work group summarized a wide range of factors affecting the profitability of the seafood industry and listed potentially useful procedures (appendix III). The work group then solicited more focused input from seafood processors/marketers to begin the process of prioritizing needs and future projects. Companies approached for feedback (phone and in-person interviews) included crab processors, surf clam processors, a fish breeder, processors of formulated products (mostly crab and clam items) and a finfish processor.

Although priorities varied somewhat among different sectors of the industry, the following areas appear to have the most interest at this time. They are not in priority order.

• Machine vision or other system for removing shell from crabmeat.

• Use of cold-set additives and forming equipment to produce large pieces of seafood from small pieces, e.g. jumbo lump crabmeat from special, restructured portion-controlled fish portions from low cost fish, and tender clam shapes from chopped clams.

• Test new pin-bone removal equipment for improving the marketability of croaker and other species with intramuscular bones.

• Test new convenience packaging for retail sales of raw seafood, seasoned or marinated seafood and pasteurized seafood.

• Identify method(s) to reduce dead-loss of crabs during holding and trucking.

Task Force members and industry partners recognize that this is a specific list of current needs. These needs are expected to change over time as solutions are identified and new challenges emerge. What is needed is a multi-faceted state supported program for identifying trends and opportunities, responding quickly to problems, testing potential solutions, and transferring that knowledge to users.

Recommendations

1) The formation of a seafood program management team to establish and monitor a grant program for the implementation of appropriate projects that support the economic health of the Maryland seafood industry. This team would prioritize, fund and oversee industry-identified projects under a rapid response structure similar to the Commercial Fish and Shellfish Technologies (CFAST) program in Virginia, housed at Virginia Tech. They will also examine new technologies, equipment, new raw and value-added products, feasibility studies, market development and cost-control strategies. We envision oversight for this program to reside within Maryland Cooperative Extension. The team would consist of nine members of the seafood industry including: a waterman, crab processor, oyster packer, surf clam processor, finfish processor, value-added processor,

wholesale seafood distributor, retailer, and a representative from the Chesapeake Bay Seafood Industries Association. It would also include five advisors from the following areas: University of Maryland College Park, University of Maryland Eastern Shore, Maryland Department of Agriculture, Maryland Department of Health and Mental Hygiene, Maryland Department of Natural Resources, and Maryland Department of Environment. The advisors would assist with project design, proposal preparation, and conducting studies as appropriate. Only industry members would vote to select the projects to be funded. All results from projects would be in the public domain so that the entire industry would benefit from the projects. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

Funding for grant funds: $250,000 per year.

2) The recruitment of at least one seafood technology (commercial food processing) specialist and one food engineer (process development, packaging systems). Two or more technicians are also needed to support field work and demonstrations. We envision two of the specialists to hold appointments principally at UMES.

Funding for salaries for the four positions described above, fringe, start-up: $470,000 first year, $384,000 per year thereafter.

3) The assemblage and coordination of other experts from industry (seafood producers, processors, buyers and food industry suppliers), and government and academic fields, as required to meet the objectives identified below. Information learned from the applied studies and other investigations produced through this initiative must have a clear outreach component so that all interested parties are informed and adequately trained in the new methods. *Funding included in items 1&2 -- no line funding.*

Total Innovative Seafood Technologies Program estimated cost: $720,000 first year, $634,000 per year thereafter.

Specific Objectives of the Above Recommendation:

1. Evaluate each core Maryland fishery (e.g. blue crabs, in-shore and off-shore fish, surf clams, hard clams and oysters) to determine current limitations to expansion, improved profitability, employment and payroll.

2. Identify industry and other partners to study feasible remedies and recommend potential strategies.

3. Conduct applied studies, such as comparisons of alternative processing methods or species substitutions, to determine those approaches most likely to succeed.

4. Conduct market tests and determine product acceptability and potential demand.

5. Implement pilot or small commercial scale demonstrations to resolve production/quality issues and to train industry, regulators and other partners.

6. Support industry in their efforts to implement procedures and to comply with associated regulations.

7. Increase public and commercial buyer awareness of programs and products.

Section III: Legislative and Regulatory and Permitting Procedures to Facilitate Sustainable Development of the Seafood Industry

The workgroup established a Fisheries Management Subcommittee to address this issue related to commercial seafood harvest. In general, the subcommittee agreed that:

- Maryland seafood production that is based on Maryland harvested product will have a greater economic impact on local economies than products imported into the state for further processing or sale.

- There is tremendous opportunity to streamline and otherwise improve Maryland's fishery regulatory climate that could lead to greater sustainable long term harvests.

- Progress on improving the regulatory situation will depend upon stakeholder identification and agreement around priority objectives,

- The task force recommendations are directed to long term improvements in the regulatory climate, not short term investigation of specific fisheries issues.

Background

The statutory, regulatory and policy framework that currently governs seafood harvesting in Maryland is the product of centuries of actions by legislative bodies and executive agencies. Over the years, many individual actions have been taken to achieve a wide variety of objectives (see box). Some serve individual objectives, while others serve multiple objectives. Some have been regularly re-assessed and adjusted over time in recognition of changing biological, economic or social conditions, while others have not.

Maryland's commercial fisheries have historically focused on broad access to commonly held resources. Large numbers of small owner operators compete for a share of public resources. Management of a common fishery requires intensive constraints on individuals that would not be required if each individual operated with a clear share or ownership stake in the resource. In addition, other user groups, including recreational anglers and environmentalists may also compete for the same resources. Some policies have been designed to achieve conservation objectives in protection of target species, or to reduce fishing gear impacts on other aquatic resources. A large number of actions have been undertaken to achieve allocation objectives: among geographic areas; between

commercial fishermen using different gear types; or, between commercial and recreational anglers.

Additionally, various social or economic objectives are served by some policies. Quotas are allocated throughout the year in some fisheries to spread landings out over a longer period of time or bring fish to market when the greatest value can be captured. Limited entry in commercial fisheries sought in part to ensure that a reasonable number of participants in could be sustained economically over time.

Still other constraints have been designed to reduce conflicts between fishermen and other user groups. These range from constraint or elimination of certain gear types like pound nets and bank traps, to distance requirements, which limit activity in certain zones where conflicts with other groups, like shoreline property owners could be minimized.

Examples of Major Objectives Historically Associated with Fisheries Regulation Based Upon Best Scientific Information Available:

1) Prevent over-fishing and conserve fishery resources

2) Conservation of habitat.

3) Allocation among competing user groups, among various geographic areas, or among different gear types.

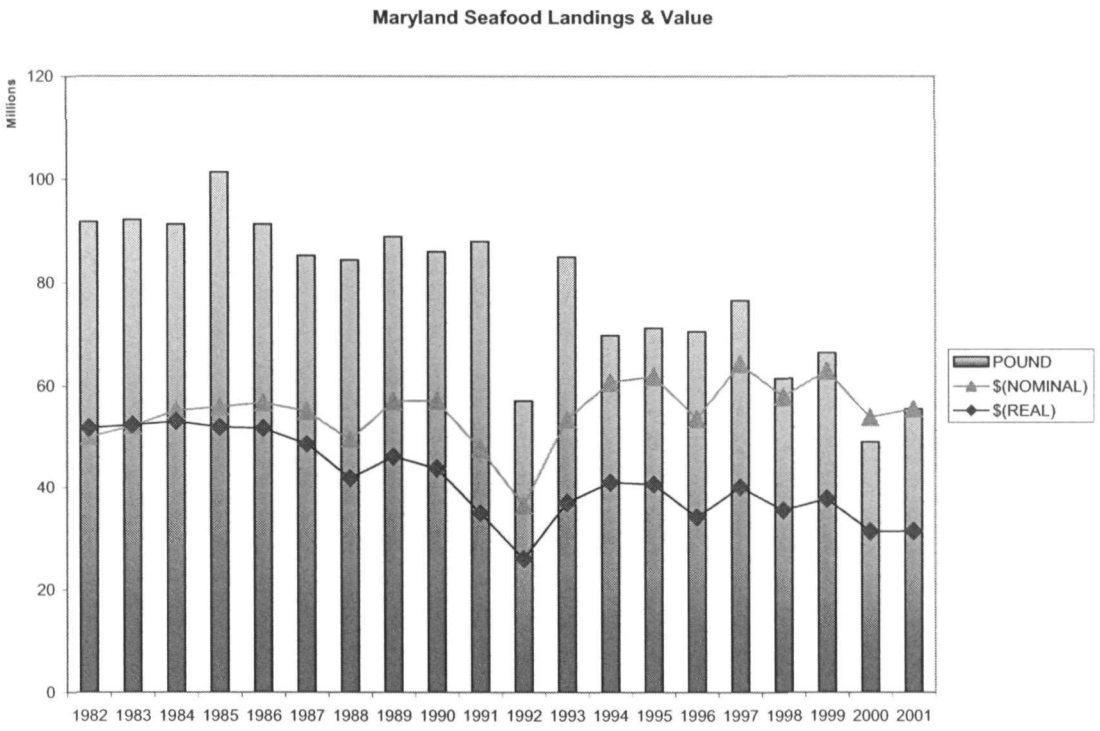
4) Maximizing economic yield from a fishery, or from among multiple fisheries (this can also focus on dockside or total economic value to the participants, including secondary processors.)

5) Promotion of other socio-economic goals, including maximizing employment, sustaining economic health of target industries or communities, etc.

6) Minimizing conflict between fishermen and other stakeholders.

Maryland's Commercial Fisheries

In 2001, Maryland seafood landings totaled 55.5 million pounds with a dockside value of $55.5 million (Figure 1). Over the past two decades, there has been a declining trend in landings that has accelerated greatly since 1992. Landings in 2001 were only 55% of the quantity landed during the peak of the period in 1985.



Although nominally the dockside value of the harvest has not changed greatly during the period, averaging around $55 million, in real terms (adjusted for inflation) dockside value in 2001 has declined 40% since 1982. The appendix details the shifting fisheries that have led to these changes with the biggest factors being the recovery of the striped bass fishery in the 1990's, the collapse of the oyster fishery and the recent decline in blue crab landings.

The Key Challenges:

The committee believes that the following three challenges must be met in any attempt to revise and improve Maryland's commercial fishing regulations:

1) Develop a clear set of objectives that will facilitate streamlining regulations

Any effort to streamline regulations must have at its center a clear set of objectives. Those objectives must include a clear prioritization of sometimes competing goals. Examples of objectives include maximizing the number of fishermen who can participate in a fishery, ensuring watermen can earn a reasonable living by engaging in fisheries, or preserving a community heritage in fishing. The objectives need to be specific – how many fishermen can the resource sustain, at what level of income?

2) Broad stakeholder participation is required for changes that may result in altered fisheries.

Decision makers and stakeholders must have the opportunity to participate in decisions that may result in a reduced emphasis on achievement of traditionally accepted conditions. Without this buy-in from the stakeholder community, there is a decreased likelihood that the objectives will be achieved.

3) Staying within target fishing rates for sustainable harvests while satisfying the economic needs of many individuals and communities.

For example it is quite easy to put in place a more efficient method for catching oysters. But doing so raises critical conservation and allocation questions. Over-fishing of oysters or gear impacts to other resources could result. Additionally, some historic participants in the fishery could see their share of the catch diminish, or be closed out entirely if new gear was too costly. Economic value of landings could be diminished if no steps are taken to slow the flow of oysters into the market.

Recommendations:

1) A long-term process needs to be developed to define and prioritize fishery management objectives. Doing so is essential if stakeholders and decision-makers are to focus regulatory programs on the preferred outcomes. Objectives must be specific to be meaningful to ensure that the end-user consumer has access to commercially caught seafood from Maryland. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

2) Within priority species, further advice is needed to help stakeholders and decision makers recommend appropriate management measures. There is a need for advice related to preferred strategies for maximizing return on a sustainable basis, including questions related to market stability and timing, and appropriate level of diversification of products. This effort may also require discussion and prioritization of market approaches (establishing/satisfying premium or niche markets vs. volume production.) The industry may also want to pursue a strategy that emphasizes value added production, favoring sectors that place emphasis on secondary processing in state, yielding a greater overall return to the local economy. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

3) All fisheries management regulations need to be completely reviewed and evaluated in order to be relevant to current conditions. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

4) Restore existing historical oyster grounds. Any rules governing the restoration must clearly state that the restoration of these areas continue to expand. Identify acceptable methods of cleaning diseased oyster bars, providing clean shell for the bars, and using hatchery produced oysters to replant the site. Restoration methods such as power dredging must be developed in order to bring shells up from the

mud, for use in these and other endeavors. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

5) In 2003, this committee tasked the Maryland Watermen's Association to develop a list of actions that they felt could be done that would make an immediate difference to watermen. The following is their list of recommendations. The Task Force will endorse the recommendations of the Maryland Watermen's Association in legislation that they may present.

Things to Help the Commercial Seafood Harvesters

FISHING

- Nighttime fishing
- Longer fishing hours for everyone
- Use of drift gill net for catching croakers and spot
- Open more yellow perch areas
- If recreational season for shad is opened – do the same for commercial

OYSTERING

- Support introducing the diploid *Crassostrea ariakensis* ("Suminoe oyster") into Maryland waters

CRABBING

- Keep current regulations in place long enough to determine if they are working

OTHER ITEMS TO CONSIDER

- Apply pressure on state and/or federal government to work with municipalities to update and fix sewer treatment plants as overflows and spills are destroying the waterways
- Persuade fishery management to work with the watermen individually so as not to allow recreational, environmental or conservation groups to dictate regulations for the commercial harvests.

Resources Required:

To accomplish the above, the University of Maryland (Sea Grant Program) needs an increase in resources to support a long-term collaborative effort to examine the future of Maryland's commercial fisheries. Maryland Sea Grant has obtained federal funding for the next five years to support a Fisheries Anthropologist at the University of Maryland College Park, but only for a total of about $20,000 a year. Matching funds from the state at an additional $20,000 per year would significantly enhance that effort and lead to the effective conduct of the type of stakeholder workshops needed to implement these

recommendations. Additionally, support of a graduate student in the Department of Agricultural & Resource Economics would provide the Sea Grant Resource Economic Specialist with the capability to conduct continuing long term research related to the types of fisheries economics issues discussed in these recommendations.

Total funding requested for an economist and a graduate student to facilitate sustainable development of the industry: $40,000 per year.

Final Summary

The Seafood Work Group of the Task Force is looking forward to bringing about improved economic development of the seafood industry while maintaining a sustainable fishery, creating more jobs and thereby more revenue to the state. The current dockside value of the Maryland seafood industry, that is just the raw product that is landed, is $49 million for approximately 53 million pounds of fish and shellfish. There are 74 processing plants employing 1,341 people (2003 statistics, NOAA). The amount of landings and the number of plants and employment have been steadily decreasing while the consumer demand for seafood has risen to 15.6 pounds per person. Of course, here in Maryland, per capita consumption is a lot higher than the national average. There is a great demand for seafood here in Maryland. We must turn those trends around and revive our very important industry. We can achieve that goal by following the recommendations of this Task Force. We need to improve processing technology, manage the fisheries and market the traditional as well as the value-added products that will be developed.

Total funding request for the Seafood Task Force recommendations is $1,280,000 for the first year and $1,179,000 thereafter including eight positions.

AQUACULTURE WORK GROUP REPORT AND RECOMENDATIONS

Executive Committee of the Aquaculture Work Group

Chip Crum, Chairperson, Maryland Aquaculture Association

Delegate Anthony J. O'Donnell
Andrew Lazur, PhD, University of Maryland Center for Environmental Science, Horn Point
Robert Parkinson, St. Thomas Creek Oysters

Aquaculture Work Group Report

The Maryland aquaculture industry needs to keep pace with growing consumer demand for high quality seafood products. With dwindling yields from traditional fisheries, including those of the Mid-Atlantic region, shortfalls in the supply of aquatic products could be met from farm-raised seafood. In addition, opportunities exist for aquaculture in ornamental fish and aquatic plant production and for improving environmental quality through fish, shellfish, and submerged aquatic vegetation restoration. Support for aquaculture development must be provided to all sectors of the industry.

Aquaculture in Maryland is facing many challenges developing into a sustainable, economically viable industry. The Aquaculture Workgroup of the *Task Force to Study the Economic Development of the Maryland Seafood and Aquaculture Industries* was established through House Bill 662 during the 2002 legislative session to address these challenges. The workgroup was charged with researching information related to the following seven topics having an impact on or a benefit to aquaculture development:

* Assess the status, economic viability, and potential of the Maryland aquaculture industry;

* Assess the economic, technical, and educational requirements for enhancement of the Maryland aquaculture industry;

* Develop mechanisms to enhance coordination among agencies and the University of Maryland to strengthen the aquaculture industry;

* Study and recommend innovative methods for aquaculture to target commercial production and restoration of critical species;

* Review methods undertaken in other states to develop their aquaculture industries;

* Considers and includes as appropriate in its report the findings of any other task force or work group engaged in a study that impacts in economic development of the aquaculture industry;

* Review and evaluate legislative and regulatory issues and permitting procedures to facilitate sustainable development of the industry

Seven subcommittees were established to address these distinct topics. Each subcommittee researched, evaluated and issued a preliminary report related to their topic. These reports were then distilled into a set of recommendations that are designed to create an infrastructure that guides responsible development of the industry and ultimately provides Maryland with expanded economic development, increased employment, and diversity in agriculture. The Aquaculture Workgroup recognizes the importance of establishing commercial aquaculture as a priority economic development activity in certain areas of the state. State agencies, institutions, commissions and other

stakeholder organizations must provide support and a regulatory framework that facilitates the growth of aquaculture without compromising environmental integrity or the public health. Biological, technical, regulatory, financial, political, social and environmental issues will have to be resolved for the industry to reach full potential. The aquaculture workgroup recommendations provide a basis for beginning this process and stressing the importance of cooperation in future policy development.

Recommendations:

1. Establish a single point of contact for aquaculture applications through a Review Board whose members include agencies having regulatory responsibility for aquaculture or a role in aquaculture development. This Board would be chaired by the *Maryland Department of Agriculture*, Aquaculture Coordinator. The Aquaculture Coordinator will need support staff and resources to track applications through the relevant agencies, to hold consultations with applicants on compliance requirements, to coordinate Maryland aquaculture policy development and be responsible for:

   Issuing aquaculture permits that are approved by the Review Board
   Administrative support for the Aquaculture Coordinating Council
   Providing an annual summary to the General Assembly on aquaculture development activities. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

FUNDING/STAFFING REQUIREMENTS

1 Inspector	$100,000
1 Administrative Support Position	$ 50,000
Operations/Coordinating Council Support	$150,000

Rationale: *It was frequently noted, through discussions with industry members who had tried to develop aquaculture businesses in Maryland or had worked in this capacity, that there needs to be a single point of contact for aquaculture applications in the State of Maryland similar to successful programs in other states. The number and types of permits needed for aquaculture depends on the species cultured, the technology used, and the size and location of the operation. Currently, an aquafarmer identifies what permits are needed and then applies to the individual agencies. This process is over burdensome, time-consuming, and can take years to complete. This delay can be attributed to the lack of coordination within the agencies when reviewing applications and to the fact that existing laws and regulations were not developed specifically for aquaculture oversight, creating indistinct compliance requirements. The Aquaculture Review Board would expedite this process by creating a one-stop shop for aquaculture applications and a coordinated, timely review process based on industry specific regulations and best management practices.*

2. Restructure the Maryland Aquaculture Advisory Committee as a Coordinating Council consisting of three representatives of the aquaculture industry, two members of the seafood industry, a representative of the Maryland Departments of Agriculture, Natural Resources, Environment, Public Works, Business and Economic Development, the Natural Resources Police, and Health and Mental Hygiene, and one each from university research and Extension. The committee will, within one year of formation, develop best management practices (BMP) for freshwater and marine aquaculture which will provide guidance for aquaculture permitting and compliance. Best Management Practices will serve as the basis for developing applicable tidal and non-tidal aquaculture regulations, notwithstanding existing federal regulations and programs and will ensure that commercial aquaculture is conducted in a manner that protects the public health. In addition, the Coordinating Council will periodically review BMP's and state regulations impacting aquaculture and make recommendations on their relevance and needed changes. The Council shall establish subcommittees, with membership at their discretion, to provide technical information on topics or issues that the Council may address. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

Rationale: *The current Maryland Aquaculture Advisory Committee was established to promote the development of an aquaculture industry in the state. The industry needs more specific guidance from a group of stakeholders with diverse expertise in issues having a direct impact on aquaculture. Industry members and agency representatives on this committee will have a working knowledge of aquaculture production and regulatory oversight within their respective agencies. The Advisory Committee will be restructured as a council that develops proposals for advancing the industry, reviews regulations, and develops best management practices. These proposals will help to develop a more comprehensive regulatory structure for aquaculture permitting used by the Aquaculture Review Board.*

3. The Aquaculture Coordinating Council shall establish pre-permitted Aquaculture Enterprise Zones to encourage responsible and sustainable development of aquaculture in the Chesapeake and Coastal Bays. Aquaculture would be specified as priority activities in these zones providing streamlined permitting and leasing incentives for private investment. These zones would also be certified as appropriate for raising fish and shellfish for consumption and would be marked as such. Wherever possible, watermen with historical records of seafood harvesting should be encouraged through development projects within these zones to learn new techniques and adapt to aquaculture businesses that will be able to provide them with economic incentives and a means of continuing to work on the water using new techniques to raise and harvest seafood. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

Rationale: *Major problems have plagued the development of shellfish aquaculture in Maryland. These include obtaining permits and leases, both on bottom and in the water column, limited state resources for individual site inspections, certification and patrol of sites, and the ability to assure compliance with the National Shellfish Sanitation Program. If these issues are not addressed in a substantive manner, there will be little expansion of this part of the industry. Pre-permitted aquaculture enterprise zones that are established in approved waters will provide a means by which the legislature can specify areas where aquaculture will be a priority. These zones would eliminate delays in site permitting, could be more readily patrolled and policed by authorities, would reduce the demand for existing resources, and will create incentive for private sector investment in shellfish production.*

4. Appropriate funding for the *University of Maryland Agricultural Experiment Station* to provide demonstration and education projects for prioritized industry issues with oversight by the Aquaculture Coordinating Council. Part of this fund ($750k) would be used to support Research and Demonstration projects that utilize scientific expertise in solving industry problems and producing results through interaction with commercial producers. A portion of this funding ($100k) will be used to support Industry Development Initiatives for ideas coming from producers. These will be limited to $10k per project and will not be used for salaries. Proposals will be reviewed by University of Maryland Extension faculty, who will provide a continuing link with the producers throughout the life of the project. Projects will result in innovations deriving from ideas of producers for enhanced production or economic efficiencies. Legislation (draft to date) that would accomplish this recommendation is located on page 23.

   To support the development of a commercially viable industry, Extension services will be funded at $100k annually. This will allow the extension faculty to continue to provide service to the industry while being able to contract with other departments for needed expertise on a short-term basis.

   Support for annual conferences ($25k each) is requested to continue programs that have been funded by the UMAES in 2003 and 2004. One will be an annual producer conference targeting aquaculture businesses and providing a means for growers to learn about the latest information regarding production innovation, legal and regulatory issues, and provide a forum for the sharing of information that could lead to a better defined voice for the industry in the state. The second program will be an annual University System of Maryland Aquaculture Symposium that will provide opportunities for faculty to interact and share ideas and research opportunities with each other for the enhancement of the industry in Maryland. This meeting will foster interaction between faculty on various campuses and with disciplines required to assist in industry development. It will assist in cross-pollinating ideas through shared experiences and provide a means for industry and academia to meet in an open forum to discuss ways to assist in solving problems.

FUNDING REQUIREMENTS

Research and Demonstration Projects	$750,000
Industry Initiative Research Program	$100,000
Extension, Outreach, and Training:	
USM Annual Aquaculture Symposium	$ 25,000
Industry Development Conference	$ 25,000
Training/Contract Services	$100,000

Rationale: *In order to assist in the development of the aquaculture industry there will be technical, legal, and production problems that must be solved. The University System of Maryland, along with the other public and private institutions of this state, offers expertise that can be directed to solving these problems.*

The UMAES has a long history of directing funds at aquaculture development through targeting specified research at the direction of an advisory board. This structure could be used to further enhance the industry by directing funds for the advancement of better growing methods and equipment, processing techniques, and marketing research.

A key need for industry is the funding of quick projects designed to assist in solving their problems. This approach has been instituted in several other states with excellent results. Applications are generated by industry and assessed by research and extension faculty. An extension specialist is designated to act as liaison with the industry in carrying out the project. At the conclusion, results are considered to be in the public domain, as long as specific sales and/or marketing information is not compromised.

5. Appropriate funding for additional *Maryland Department of Natural Resources* staff for aquaculture permitting, enforcing regulations, and patrolling aquaculture sites. Currently, there is no DNR staff working full-time solely on aquaculture, in any aspect of the program. Many Natural Resources staff and NRP officers support programmatic activities as part of their duties. The impact of an increase in the number of aquaculture sites, upon DNR, can not be accurately estimated at this time. However, Task Force recommendations have been evaluated to determine their impact on existing Departmental sectors and staff. Immediate funding and staffing needs to support these recommendations are listed below.

FUNDING/STAFFING REQUIREMENTS

1 Administrative Position	$ 40,000
2 Field Staff Positions	$ 80,000
4 NRP Positions	$160,000
Operations	$282,000

Rationale: *The Department of Natural Resources (DNR) has several roles relating to aquaculture, including aquaculture site registration, Bay bottom leasing, and natural resource protection and enforcement via the Natural Resource Police (NRP). An increase in the number of aquaculture operations is anticipated as the recommendations in this report are instituted. Land-based aquaculture sites typically require less resource dedication than shellfish aquaculture operations in public waters. An increase in*

shellfish aquaculture sites through the establishment of enterprise zones, and an increase in bottom leases will require significant management and enforcement efforts by DNR. As this process evolves, DNR will need to substantially increase staff and operating budgets to effectively protect natural resources and insure regulatory compliance.

6. Appropriate funding for additional *Maryland Department of Environment, Technical and Regulatory Services Administration* staff to conduct surveys and to certify additional shellfish growing waters and enterprise zones in the Chesapeake and Coastal Bays. For safety purposes while working on the water, the assumptions are that two-person teams would be employed. Monitoring requirements to open new sites require approximately 30 samples over several years and periodic shoreline sanitary surveys.

FUNDING/STAFFING REQUIREMENTS

Individual Sites

Five sites not in close proximity requiring 5 individual site visits 24 times per year

Salary	$ 44,500
Operations	$ 8,250

$52,750 or $10,550 per site

Enterprise Zones

Five sites in close proximity that can be sampled together in one day 24 times per year

Salary	$ 8,900
Operations	$ 8,250

$17,150 or $3,430 per site

Larger program consisting of 25 individual sites or 5 enterprise zones would require dedicated staff and funding estimated at $194,243 annually. Such large-scale efforts would require dedicated vehicles, boats, trailers, and related equipment.

Resources for a Dedicated Monitoring Team

Team fully equipped and dedicated to aquaculture monitoring:

Salary/wages	$ 62,364
Operations	$131,879

Rationale: *Maryland has an effective program of monitoring shellfish growing waters to ensure the protection of human health. In order to maintain the integrity of this program, satisfy the requirements of the National Shellfish Sanitation Program, and provide the expanding industry with inspection, certification, and monitoring services the Department of Environment will require additional staff and funding. Annual costs for monitoring and assessing an individual site are estimated to be $10,550. However, multiple sites in proximity to each other, or to other natural bottom harvesting activities, that can be visited in a single field trip, such as might be envisioned in an enterprise zone, may cost as little as $3,430 per site (assuming that approximately five sites could*

be visited in a single day). As the industry expands, this will become a significant departmental expenditure.

7. It is recommended that the State; provide for additional private leasing of Maryland's Chesapeake and Coastal Bays by lifting the moratorium on bottom leases in individual counties. Lifting the leasing moratorium and creating aquaculture enterprise zones will promote shellfish aquaculture which will provide the Maryland aquaculture and seafood industries with expanded opportunity for growth and help to rebuild shellfish stocks and improve water quality in the Chesapeake region.

8. It is recommended that the State; consider, study, and possibly confirm the use of non-native oyster species for aquaculture in areas that are presently unable to support native populations. These non-natives may be able to tolerate the current conditions and provide watermen with a harvestable product while native populations rebound. Non-native species may also serve to improve water quality and provide the habitat for other aquatic animals that once existed on natural oyster bars in the Chesapeake.

By: **Senator Klausmeier**

SECTION 1. BE IT ENACTED BY THE GENERAL ASSEMBLY OF MARYLAND, That the Laws of Maryland read as follows:

Article - Agriculture

2-102.

(c) The Secretary, with the approval of the Governor, shall appoint a deputy secretary who [has the] **SHALL HAVE DIRECT AUTHORITY OVER ALL MATTERS IN THE DEPARTMENT RELATED TO SEAFOOD AND AQUACULTURE AND ANY OTHER** duties provided by law or delegated by the Secretary. The deputy secretary serves at the pleasure of the Secretary and shall receive the salary provided in the State budget.

2-106.

(a) The following positions and units are included within the Department:

(1) The Tobacco Authority of the State of Maryland;

(2) The Maryland Agricultural Fair Board;

(3) The Chief of Weights and Measures;

(4) The State Chemist;

(5) The State Veterinarian;

(6) The State Board of Veterinary Medical Examiners;

(7) The State Soil Conservation Committee;

(8) The Board of Review of the Department of Agriculture;

(9) The Maryland Agricultural Commission;

(10) The Maryland Horse Industry Board;

(11) The Seafood Marketing **AND AQUACULTURE DEVELOPMENT PROGRAM** [Authority] and Division of Market Development ;

(12) The Seafood Marketing Advisory Commission;

(13) The Maryland Winery and Grape Growers' Advisory Board; [and]

(14) [Aquaculture Advisory Committee] **AQUACULTURE REVIEW BOARD; AND**

(15) AQUACULTURE COORDINATING COUNCIL.

10-1001.

(a) There is a Seafood Marketing **AND AQUACULTURE DEVELOPMENT PROGRAM** [Authority] and a Division of Market Development.

(b) The Seafood Marketing **AND AQUACULTURE DEVELOPMENT PROGRAM** [Authority] and Division of Market Development shall be part of the Department of Agriculture.

(c) **(1)** The Seafood Marketing **AND AQUACULTURE DEVELOPMENT PROGRAM** [Authority] and Division of Market Development shall have the powers, duties, responsibilities, and functions provided in the laws of this State.

(2) THE SEAFOOD MARKETING AND AQUACULTURE DEVELOPMENT PROGRAM SHALL BE:

(I) UNDER THE DIRECT AUTHORITY OF THE DEPUTY SECRETARY; AND

(II) RESPONSIBLE FOR THE NATIONAL AND INTERNATIONAL MARKETING OF SEAFOOD PRODUCTS.

10-1002.

(a) There is a Seafood Marketing Fund.

(b) The Fund may receive proceeds from activities conducted by the Seafood Marketing **AND AQUACULTURE DEVELOPMENT PROGRAM** [Authority]. These activities may include cookbook sales, poster sales, seafood festivals, and similar activities.

(c) The Secretary shall adopt regulations to administer the Seafood Marketing Fund.

SUBTITLE 10A. SEAFOOD PROGRAM MANAGEMENT TEAM.

10A-1001.

(A) THERE IS A SEAFOOD PROGRAM MANAGEMENT TEAM TO BE ADMINISTERED BY THE UNIVERSITY OF MARYLAND, MARYLAND COOPERATIVE EXTENSION.

(B) THE TEAM SHALL:

(1) ESTABLISH AND MONITOR A GRANT PROGRAM FOR THE IMPLEMENTATION OF APPROPRIATE PROJECTS THAT SUPPORT THE ECONOMIC HEALTH OF THE MARYLAND SEAFOOD INDUSTRY;

(2) PRIORITIZE, SELECT FOR FUNDING, AND OVERSEE SEAFOOD INDUSTRY PROJECTS UNDER A RAPID RESPONSE STRUCTURE; AND

(3) EXAMINE NEW TECHNOLOGIES, EQUIPMENT, RAW AND VALUE-ADDED PRODUCTS, FEASIBILITY STUDIES, AND MARKET DEVELOPMENT AND COST CONTROL STRATEGIES.

(C) THE TEAM SHALL CONSIST OF 15 INDIVIDUALS, INCLUDING:

(1) 9 MEMBERS, INCLUDING:

(I) 1 HOLDER OF A COMMERCIAL FISHING LICENSE;

(II) 1 CRAB PROCESSOR;

(III) 1 OYSTER PACKER;

(IV) 1 SURF CLAM PROCESSOR;

(V) 1 FINFISH PROCESSOR;

(VI) 1 VALUE-ADDED PROCESSOR;

(VII) 1 WHOLESALE SEAFOOD DISTRIBUTOR;

(VIII) 1 SEAFOOD RETAILER; AND

(IX) 1 REPRESENTATIVE OF THE CHESAPEAKE BAY SEAFOOD INDUSTRIES ASSOCIATION; AND

(2) 6 ADVISORS, INCLUDING 1 REPRESENTATIVE EACH FROM:

(I) THE UNIVERSITY OF MARYLAND, COLLEGE PARK;

(II) THE UNIVERSITY OF MARYLAND, EASTERN SHORE;

(III) THE DEPARTMENT;

(IV) THE DEPARTMENT OF THE ENVIRONMENT;

(V) THE DEPARTMENT OF NATURAL RESOURCES; AND

(VI) THE DEPARTMENT OF HEALTH AND MENTAL HYGIENE.

(D) (1) (I) TEAM MEMBERS SHALL SELECT THE CHAIR FROM AMONG THE TEAM MEMBERS.

(II) ONLY TEAM MEMBERS MAY VOTE IN THE SELECTION OF PROJECTS TO BE FUNDED.

(2) AT THE INVITATION OF THE MEMBERS, TEAM ADVISORS MAY ASSIST WITH PROJECT DESIGN, PROPOSAL PREPARATION, AND PROJECT-RELATED RESEARCH.

(E) IF A PROJECT IS FUNDED BY THE TEAM, THE TEAM SHALL MAKE PUBLIC THE PROJECT=S DESIGN AND RESULTS.

SUBTITLE 10B. INNOVATIVE SEAFOOD TECHNOLOGIES PROGRAM.

10B-1001.

(A) THERE IS AN INNOVATIVE SEAFOOD TECHNOLOGIES PROGRAM.

(B) THE PROGRAM SHALL:

(1) WITH INDUSTRY AND OTHER RELEVANT PARTNERS, EVALUATE EACH CORE MARYLAND FISHERY TO DETERMINE THE NATURE AND EXTENT OF LIMITATIONS ON EXPANSION AND PROFITABILITY AND TO IDENTIFY POTENTIAL STRATEGIES FOR GROWTH;

(2) CONDUCT APPLIED STUDIES, INCLUDING COMPARISONS OF ALTERNATIVE PROCESSING METHODS OR SPECIES SUBSTITUTION, TO DETERMINE THOSE METHODS MOST LIKELY TO SUCCEED;

(3) CONDUCT MARKET TESTS TO DETERMINE PRODUCT ACCEPTABILITY AND POTENTIAL DEMAND;

(4) AS APPROPRIATE, IMPLEMENT PILOT PROJECTS AND SMALL COMMERCIAL DEMONSTRATIONS TO RESOLVE ANY OUTSTANDING QUALITY OR PRODUCTION ISSUES AND TO EDUCATE INDUSTRY REPRESENTATIVES, REGULATORS, AND OTHER PARTNERS;

(5) SUPPORT THE SEAFOOD INDUSTRY IN ITS EFFORTS TO IMPLEMENT INNOVATIVE PROCEDURES AND TO COMPLY WITH ASSOCIATED REGULATIONS; AND

(6) ENHANCE THE AWARENESS OF INNOVATIVE PRODUCTS AND PROGRAMS AMONG COMMERCIAL BUYERS AND THE GENERAL PUBLIC.

(C) AS APPROPRIATE, THE PROGRAM SHALL UTILIZE THE EXPERTISE OF REPRESENTATIVES OF THE SEAFOOD PROGRAM MANAGEMENT TEAM, THE SEAFOOD INDUSTRY, INCLUDING SEAFOOD PRODUCERS, PROCESSORS, BUYERS, AND FOOD INDUSTRY SUPPLIERS, AND GOVERNMENT AND RELATED ACADEMIC FIELDS.

10-1301.

(a) (1) The General Assembly defines aquaculture as an agricultural activity.

(2) "Aquaculture" includes the commercial rearing of finfish, shellfish, and aquatic plants for sale, trade, barter, or shipment.

(b) It is the intent of the General Assembly to create **[**an advisory committee**]:**

(1) AN AQUACULTURE REVIEW BOARD AND AN AQUACULTURE COORDINATING COUNCIL to promote the development of an aquaculture industry in this State; **AND**

(2) AN AQUACULTURE COORDINATOR TO ASSIST PERSONS IN OBTAINING ALL OF THE PERMITS AND LICENSES NECESSARY TO CONDUCT AQUACULTURE IN THE STATE.

(c) The Maryland Department of Agriculture is the lead agency for **[**promoting**]:**

(1) PROMOTING, coordinating, and marketing aquaculture and aquaculture products; **AND**

(2) COORDINATING AND STREAMLINING THE PROCESS OF APPLICATION FOR A STATE AQUACULTURE PERMIT.

(d) The Department of Natural Resources is responsible for enforcement of laws, regulations, and rules.

(e) The University of Maryland is the lead agency for research in aquaculture production and shall be responsible for development of education and extension programs which promote aquaculture as an industry.

10-1302.

(A) THERE IS AN AQUACULTURE REVIEW BOARD.

(B) THE REVIEW BOARD SHALL CONSIST OF 4 MEMBERS, EACH OF WHOM SHALL REPRESENT ONE OF THE FOLLOWING STATE DEPARTMENTS CHARGED WITH RESPONSIBILITY FOR AN ASPECT OF THE STATE AQUACULTURE PERMITTING PROCESS OR OVERSIGHT OF PERMIT COMPLIANCE, INCLUDING:

(1) THE DEPARTMENT OF AGRICULTURE, TO BE REPRESENTED BY THE AQUACULTURE COORDINATOR, WHO SHALL SERVE AS CHAIR;

(2) 1 REPRESENTATIVE OF THE DEPARTMENT OF THE ENVIRONMENT DESIGNATED BY THE SECRETARY OF THE ENVIRONMENT;

(3) 1 REPRESENTATIVE OF THE DEPARTMENT OF HEALTH AND MENTAL HYGIENE DESIGNATED BY THE SECRETARY OF HEALTH AND MENTAL HYGIENE; AND

(4) 1 REPRESENTATIVE OF THE DEPARTMENT OF NATURAL RESOURCES DESIGNATED BY THE SECRETARY OF NATURAL RESOURCES.

(C) (1) THE AQUACULTURE COORDINATOR SHALL BE THE SINGLE POINT OF CONTACT FOR AN APPLICANT FOR ALL PERMITS AND LICENSES NECESSARY TO CONDUCT AQUACULTURE IN THE STATE.

(2) THE REVIEW BOARD SHALL:

(I) COORDINATE THE DEVELOPMENT OF STATEWIDE AQUACULTURE POLICY AND, TO THE MAXIMUM EXTENT FEASIBLE, THE STREAMLINING OF THE APPLICATION PROCESS;

(II) TRACK EACH APPLICATION AS IT PROGRESSES THROUGH EACH DEPARTMENT; AND

(III) PRIORITIZE FULL AND MEANINGFUL COMMUNICATION WITH AN APPLICANT DURING EACH STAGE OF THE APPLICATION PROCESS.

(D) BY DECEMBER 31 OF EACH YEAR AND IN ACCORDANCE WITH § 2-1246 OF THE STATE GOVERNMENT ARTICLE, THE AQUACULTURE COORDINATOR SHALL PREPARE AN ANNUAL REPORT ON THE ACTIVITIES OF THE REVIEW BOARD, INCLUDING AN ACCOUNTING OF THE PERMIT APPLICATIONS RECEIVED AND TRACKED BY THE REVIEW BOARD.

[10-1302.**]** **10-1303.**

(a) There is an Aquaculture **[**Advisory Committee**]** **COORDINATING COUNCIL**.

(b) The **[**Advisory Committee**]** **COORDINATING COUNCIL** shall consist of **[**21**]** **15** members, **INCLUDING**:

(1) 1 member of the Maryland Senate designated by the President of the Senate;

(2) 1 member of the Maryland House of Delegates designated by the Speaker of the House;

(3) 1 representative of the Department of Agriculture designated by the Secretary of Agriculture;

(4) 1 representative of the Department of Natural Resources Police designated by the Secretary of Natural Resources;

(5) 1 representative of the Department of Natural Resources, Tidewater Administration, designated by the Secretary of Natural Resources;

(6) **[**1 representative**]** **2 REPRESENTATIVES** of the **[**College of Agriculture at the**]** University of Maryland designated by the President of the University of Maryland, College Park:

(I) 1 WITH EXPERTISE IN AQUACULTURE RESEARCH AND DEVELOPMENT; AND

(II) 1 REPRESENTING THE AGRICULTURAL COOPERATIVE EXTENSION;

(7) 1 representative of the Department of Business and Economic Development designated by the Secretary of Business and Economic Development**[**, who shall be a nonvoting member**]**;

(8) 1 representative of the Department of the Environment designated by the Secretary of the Environment**[**, who shall be a nonvoting member**]**;

(9) 1 representative of the Department of Health and Mental Hygiene designated by the Secretary of Health and Mental Hygiene**[**, who shall be a nonvoting member; and**]**

(10) **[**12 members appointed by the Governor:

(i) 5 who shall represent the aquaculture or agriculture industry;

(ii) 1 who shall represent the aquaculture supplier industry;

(iii) 1 who shall represent licensed Maryland seafood harvesters;

(iv) 2 who shall represent the wholesale and retail seafood industry;

(v) 1 who shall represent seafood consumers;

(vi) 1 who shall represent the scientific community; and

(vii) 1 member of the Boat Act Advisory Commission or the Tidal Fisheries Advisory Commission] **3 REPRESENTATIVES OF THE AQUACULTURE INDUSTRY, DESIGNATED BY THE GOVERNOR; AND**

(11) 2 REPRESENTATIVES OF THE SEAFOOD INDUSTRY, DESIGNATED BY THE GOVERNOR.

(c) **(1)** The **[**Advisory Committee**]** **COORDINATING COUNCIL** shall **[**formulate**]:**

(I) FORMULATE and make proposals for advancing Maryland aquaculture, including recommendations for a fee structure on aquaculture operations in order to reduce State expenditures on aquaculture programs;

(II) ESTABLISH AND MONITOR A GRANT PROGRAM FOR THE IMPLEMENTATION OF APPROPRIATE PROJECTS THAT SUPPORT THE ECONOMIC HEALTH OF THE MARYLAND AQUACULTURE INDUSTRY;

(III) CONDUCT APPLIED STUDIES;

(IV) CONDUCT MARKET TESTS TO DETERMINE PRODUCT ACCEPTABILITY AND POTENTIAL DEMAND;

(V) AS APPROPRIATE, IMPLEMENT PILOT PROJECTS AND SMALL COMMERCIAL DEMONSTRATIONS TO RESOLVE ANY OUTSTANDING QUALITY OR PRODUCTION ISSUES AND TO EDUCATE INDUSTRY REPRESENTATIVES, REGULATORS, AND OTHER PARTNERS;

(VI) SUPPORT THE AQUACULTURE INDUSTRY IN ITS EFFORTS TO IMPLEMENT INNOVATIVE PROCEDURES AND TO COMPLY WITH ASSOCIATED REGULATIONS;

(VII) ENHANCE THE AWARENESS OF INNOVATIVE PRODUCTS AND PROGRAMS AMONG COMMERCIAL BUYERS AND THE GENERAL PUBLIC

(VIII) BY DECEMBER 31, 2006, DEVELOP BEST MANAGEMENT PRACTICES THAT:

1. PROVIDE GUIDANCE FOR FRESHWATER AND MARINE AQUACULTURE PERMITTING AND COMPLIANCE; AND

2. SERVE AS THE BASIS FOR THE ADOPTION OF STATE REGULATIONS REGARDING TIDAL AND NONTIDAL AQUACULTURE;

(IX) INVESTIGATE AND, TO THE EXTENT FEASIBLE, ENHANCE THE AREA OF THE CHESAPEAKE BAY THAT IS AVAILABLE TO PRIVATE LEASE FOR PURPOSES RELATED TO THE AQUACULTURE AND SEAFOOD INDUSTRIES;

(X) ESTABLISH PRE-PERMITTED AQUACULTURE ENTERPRISE ZONES IN THE CHESAPEAKE AND COASTAL BAYS, SO AS TO:

1. STREAMLINE THE PERMITTING PROCESS IN THESE ZONES;

2. PROVIDE INCENTIVES FOR PRIVATE INVESTMENT IN LEASING OPERATIONS; AND

3. ENCOURAGE INDIVIDUALS WITH HISTORICAL RECORDS IN THE COMMERCIAL FISHERY TO ADAPT THEIR EXPERTISE TO THE RAISING AND HARVESTING OF SEAFOOD BY AQUACULTURE; AND

(XI) ON A REGULAR BASIS, REVIEW STATE REGULATIONS IMPACTING AQUACULTURE AND MAKE RECOMMENDATIONS TO THE AQUACULTURE REVIEW BOARD REGARDING ANY NECESSARY OR ADVISABLE REGULATORY CHANGES.

(2) THE COORDINATING COUNCIL MAY ESTABLISH SUBCOMMITTEES TO PROVIDE TECHNICAL ASSISTANCE TO THE COUNCIL, WITH SUBCOMMITTEE TOPICS AND MEMBERSHIP AS THE COUNCIL DETERMINES TO BE APPROPRIATE.

(d) (1) The term of a member appointed by the Governor is 3 years.

(2) The terms of the members appointed by the Governor serving on July 1, **[**1988**]** **2006** expire as follows:

(i) **[**4 members**]** **1 MEMBER** in **[**1989**]** **2007**;

(ii) **[**4 members**]** **1 MEMBER** in **[**1990**]** **2008**; and

(iii) **[**4 members**]** **1 MEMBER** in **[**1991**]** **2009**.

(3) At the end of a term, a member continues to serve until a successor is appointed and qualifies.

(4) A member who is appointed after a term begins serves only for the rest of the term and until a successor is appointed and qualifies.

(5) An appointed member may not serve more than 2 consecutive terms.

(e) The Governor may remove a member for incompetence or misconduct.

(f) The [Advisory Committee] **COORDINATING COUNCIL** may elect from among its [appointed] members a chairman, vice-chairman, secretary and other officers it deems appropriate.

(g) The [Advisory Committee] **COORDINATING COUNCIL** shall determine the time and place of its meetings.

(h) The members of the [Committee] **COORDINATING COUNCIL** may not receive a salary, but shall be reimbursed for reasonable expenses incurred in attending meetings and other [Committee] **COUNCIL** business, as provided under the Standard State Travel Regulations.

Article - Natural Resources

4-1103.

(a) **(1)** The Department shall [take measures which in its judgment seem best calculated to increase the productivity or utility of any part of] **RESTORE** the natural oyster bars of the State **BY:**

(I) IDENTIFYING AND USING EFFECTIVE METHODS OF CLEANING DISEASED OYSTER BARS;

(II) PROVIDING CLEAN SHELL FOR THE BARS; AND

(III) USING HATEHERY PRODUCED OYSTERS TO REPLANT SITES.

(2) NOTWITHSTANDING ANY OTHER PROVISION OF LAW, THE DEPARTMENT MAY NOT USE A RESTORATION METHOD, INCLUDING POWER DREDGING, VACUMING, OR A SIMILAR METHOD FOR BRINGING SHELLS UP FROM THE BOTTOM, UNLESS THE DEPARTMENT FINDS THAT IT IS SAFE FOR USE IN A NATURAL OYSTER BAR.

SECTION 2. AND BE IT FURTHER ENACTED, That the Laws of Maryland read as follows:

Article - Natural Resources

4-204.

(a) (1) There is a Tidal Fisheries Advisory Commission in the Department.

(2) The Commission is composed of up to 12 members appointed and serving in accordance with the procedures adopted under ' 1-102(c) of this article.

(3) Up to eleven commercial watermen and one member of the Sports Fisheries Advisory Commission shall comprise the Commission.

(4) The term of a member is 2 years.

(5) BY DECEMBER 1, 2006, THE COMMISSION SHALL:

(I) DEVELOP A LONG-TERM PROCESS TO DEFINE AND PRIORITIZE SPECIFIC FISHERY MANAGEMENT OBJECTIVES, SO AS TO ENSURE THAT END-USE CONSUMERS HAVE ACCESS TO SEAFOOD COMMERCIALLY HARVESTED IN MARYLAND;

(II) WITHIN PRIORITY SPECIES, IDENTIFY APPROPRIATE MANAGEMENT MEASURES AND PREFERRED STRATEGIES FOR THE MAXIMIZATION OF A SUSTAINABLE RETURN AND MAKE THIS INFORMATION AVAILABLE TO STATE OFFICIALS INVOLVED IN DECISIONMAKING FOR THE MANAGEMENT OF THESE SPECIES, STAKEHOLDERS, AND THE GENERAL PUBLIC; AND

(III) REPORT ON THESE MATTERS TO THE GOVERNOR AND, IN ACCORDANCE WITH ' 2-1246 OF THE STATE GOVERNMENT ARTICLE, THE SENATE EDUCATION, HEALTH, AND ENVIRONMENTAL AFFAIRS COMMITTEE AND THE HOUSE ENVIRONMENTAL MATTERS COMMITTEE.

SECTION 3. AND BE IT FURTHER ENACTED, That this Act shall take effect June 1, 2005. Section 2 of this Act shall remain effective for a period of 1 year and 7 months years and, at the end of December 31, 2006, with no further action required by the General Assembly, Section 2 of this Act shall be abrogated and of no further force and effect.

APPENDIX I

Seafood Work Group
Study of State Seafood Marketing Programs

Five states with seafood marketing programs were contacted for this study and compared to the Maryland Aquaculture Development and Seafood Marketing Program. They include the following: Maine Lobster Promotion Council, Louisiana Seafood Promotion & Marketing Board, Virginia Marine Products Board, Alaska Seafood Marketing Institute and the Florida Bureau of Seafood and Aquaculture (Division of Marketing and Development in the Florida Department of Agriculture.)

Maine Lobster Promotion Council

Contact: Sue Barber, Executive Director, (207) 947-2966
In 2002, Maine landed 60.7 million pounds of American Lobster with a value of $202.1 million*. The Council's budget is approximately $379,000 which is derived from a flat fee on lobster fishing licenses of approximately $32 each and a flat fee of $250 for wholesalers. The Council is mandated by legislation and is reviewed every four years. There are three employees of the Council. They are considered private employees of a public entity. They have autonomy from the state of Maine, although the state collects their fees through the Maine Marine Resources Department. They also receive grant funding from the federal government and also generate revenue from sales to the public of promotional materials. They are responsible for international marketing of the product. The advisory board consists of nine members plus state Department Commissioners. The board members serve three terms and are representatives of harvesters, wholesalers/dealers and the public in each of three districts of the state. Ms. Barber recommends that any board or council needs 100% of industry support and a budget of $1 million.

Louisiana Seafood Promotion & Marketing Board

Contact: Ewell Smith, Executive Director, (504) 568-5693
In 2002, Louisiana landed 1.3 billion pounds of seafood valued at $305 million*. The Board has an annual budget of approximately $1 million. There are four employees plus an intern. Funding is received from the fishery on a per license fee. The Board also receives Gulf & South Atlantic Fisheries Development grants as well as Shrimp and Oyster relief money. They are mandated by legislation and are state employees under the Department of Wildlife & Fisheries. They do not sell any promotional material. They have an advisory board of 14-15 members. They are just beginning to do international marketing. Aquaculture products (including crawfish) are marketed under the Department of Agriculture.

Virginia Marine Products Board

Contact: Shirley Estes, Executive Director, (757) 874-3474
In 2002, Virginia landed 442 million pounds of seafood valued at $123.3 million*. There are three employees. The annual budget is approximately $300,000 which is derived 100% from industry funds. Funds are collected by the Virginia Marine Resource Commission from processor and harvester fees. The Board sells promotional material including cookbooks, aprons and brochures in large quantities. They are mandated by legislation and have loose ties with the Department of Agriculture. They are one of eleven marketing boards of the Virginia Department of Agriculture and Consumer Services. VDACS provides accounting and IT services and the Board must follow state procurement and Human Resources guidelines. The VMPB reports directly to an advisory board consisting of eleven members (one of whom represents the menhaden industry) and are appointed by the Governor with recommendations by the industry. They have international marketing responsibilities and do not promote any aquaculture products.

Alaska Seafood Marketing Institute

Contact: Laura Fleming, Public Relations Director, (907) 465-5560
In 2002, Alaska landed over 5 billion pounds of seafood with a value of $811.5 million*. The Institute's annual budget is approximately $ 10-11 million from .3% processor tax ($2.5 million), 1% salmon tax ($3.1 million), and federal grants ($4.1 million). The Institute does not sell any promotional items. The Institute has 17 employees (eight in Alaska, four in the domestic U.S. and five overseas). The fishery taxes are collected by the Department of Revenue. The Board of Directors consist of 25 appointed members to represent all divisions of the industry plus ex-officio members of one Congressman, one Senator and the Commissioner of the Department of Community and Economic Development. The Institute is mandated by legislation and has no relationship with the Department of Agriculture. It is responsible for international marketing activities. They do not market aquaculture products.

Bureau of Seafood and Aquaculture, (Florida Department of Agriculture and Consumer Services

Contact: JoAnne McNeely, Bureau Chief, (850) 488-0163
In 2002, Florida landed 82 million pounds of seafood with a value of $178 million*. In FY 2003, the Bureau had an annual budget of approximately $400,000 but in FY 2004 it has $50,000 from general funds. The Bureau is mandated by law. They receive federal grants and industry advisory money for certain species such as alligator or tropical fish. Currently, they do not have clam marketing money. There are 2 ½ employees assigned to marketing and the Bureau is within the Department of Agriculture. They have an advisory board with members representing aquaculture, seafood, retailers, wholesalers and processors. There are also liaison advisory boards with marketing funds for commodities such as alligator and tropical fish. They have international marketing

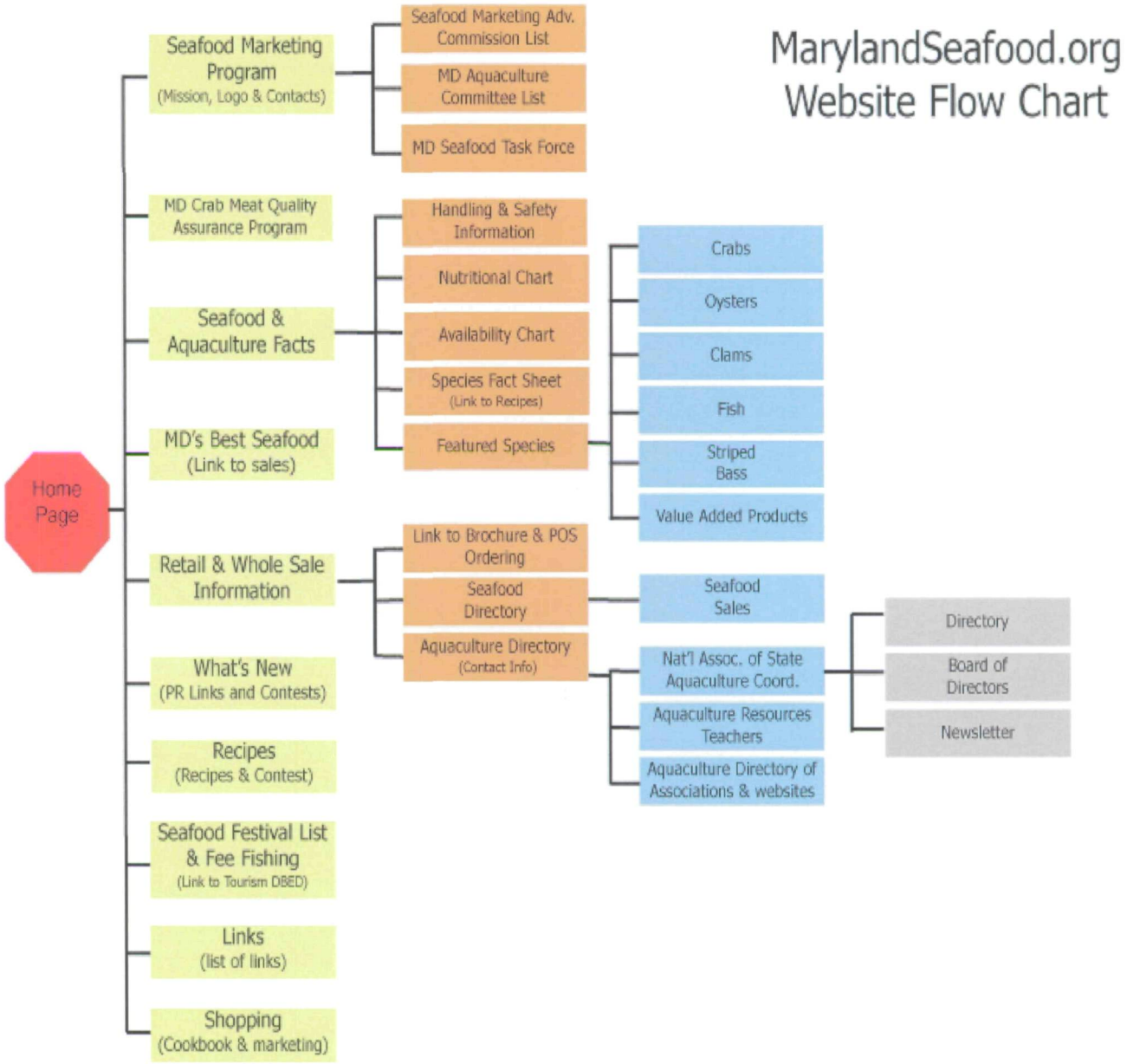
responsibilities and market aquaculture products. The reason for the change in funding from 2003 to 2004 is the lack of support from the clam industry.

Aquaculture Development and Seafood Marketing Program, (Maryland Department of Agriculture)

In 2002, Maryland landed 53.2 million pounds of seafood with a value of $49 million*. The FY 2004 budget is approximately $275,000 from general funds and $65,550 from a $10 surcharge on commercial harvesters and seafood processors licenses. While there are four employees in the program, only one employee is officially assigned to marketing. The marketing program is mandated by legislation and there is a Seafood Marketing Advisory Commission consisting of thirteen members representing harvesters, processors, aquaculture, retailers, consumers and representatives of the Secretaries of Agriculture and Natural Resources. The Program is also responsible for Aquaculture Development. It has an Aquaculture Advisory Committee consisting of 21 members representing the aquaculture industry, state departments dealing with aquaculture, a seafood industry member, consumer member and a representative of the General Assembly. The Aquaculture Development and Seafood Marketing Program is part of the Department of Agriculture. It currently is not responsible for international marketing. The Program also markets Maryland aquaculture products.

**Fisheries of the United States, 2002.* National Marine Fisheries Service, September, 2003.

APPENDIX II


MarylandSeafood.org
Website Flow Chart
Home Page
Seafood Marketing Program
(Mission, Logo & Contacts)
Seafood Marketing Adv. Commission List
MD Aquaculture Committee List
MD Seafood Task Force
MD Crab Meat Quality Assurance Program
Seafood & Aquaculture Facts
Handling & Safety Information
Nutritional Chart
Availability Chart
Species Fact Sheet
(Link to Recipes)
Featured Species
Crabs
Oysters
Clams
Fish
Striped Bass
Value Added Products
MD's Best Seafood
(Link to sales)
Retail & Whole Sale Information
Link to Brochure & POS Ordering
Seafood Directory
Seafood Sales
Aquaculture Directory
(Contact Info)
Nat'l Assoc. of State Aquaculture Coord.
Directory
Board of Directors
Newsletter
Aquaculture Resources Teachers
Aquaculture Directory of Associations & websites
What's New
(PR Links and Contests)
Recipes
(Recipes & Contest)
Seafood Festival List & Fee Fishing
(Link to Tourism DBED)
Links
(list of links)
Shopping
(Cookbook & marketing)

APPENDIX III

Subgroup to study and develop innovative seafood processing techniques

Situation

- Static or declining resource base.
- High cost of raw materials.
- Traditional industries (e.g. seasonal "wet fish" trade), but changing markets require consistent quality, supply and convenience for use in foodservice and retail.
- Increased global competition.
- Numerous small businesses lack buying and marketing clout.
- High production costs, including labor and automated equipment.

Our Strengths

- The Chesapeake Bay has a positive, national reputation.
- Maryland is home to numerous seafood processors, distributors and importers.
- Long history of marketing seafood.
- Maryland is strategically located near major metropolitan markets, federal government centers, trade organizations and universities.

Strategies for Task Force

I. Technologies to investigate:
Processing Aids
Equipment
Head/gut
Scale/skin
Filet
Pin-bone removal
De-bone/mince
Restructure/portioning (cold-set binders, heat-set binders including surimi)
Coatings application
High Hydrostatic Pressure vessels (shucking, shelf-life, food safety)
Machine vision (grading, defect/shell removal)

Quality/Safety assurance throughout distribution
Antimicrobial additives
Edible films
Modified atmospheres
Moisture control systems
Sanitation systems
Reduced shellfish dead loss
X-ray
Electron beam
Time-temperature integrators
Biosensors
Computerized systems for tracking and monitoring the status of sensitive products

Others (pulsed electric field, pulsed light, oscillating magnetic fields; microwave, radio frequency, ohmic and inductive heating; ultrasound)

Packaging
- Clear can for pasteurized crabmeat and other seafood
- High OTR skin wrap packaging (Cryovac, complies with FDA "ban" on vacuum packaging)
- "Smart" packaging
- Microwaveable/dual ovenable, easy open, re-sealable, etc.

Added value
- Grill and serve
- Heat and serve
- Marinated
- Nutrition (omega-3 fatty acids, low fat coatings)
- Restructured, e.g. lump crabmeat formed from special
- Portion controlled
- Formulated products
- Anything leading to rapid, low risk preparation

Byproducts/waste recovery and specialty products
- Nutriceuticals
- Pharmaceuticals, cosmetics/skin care products
- Chitin/Chitosan
- Fish gelatins
- Flavors
- Enzymes
- Biochemicals (e.g. for analytical methods)
- Fertilizer/compost

Market assessment tools
- Focus groups
- Sampling at retail outlets, festivals
- Seafood shows

Contract with marketing consulting group(s) e.g. Moskowitz Jacobs, Inc.

II. Establish demonstration center
- Maryland Food Center Authority, Rock Hall facility
- New food science building at UMES, opened summer 2003
- Write agreements with other pilot facilities and labs

III. Establish cooperative(s)
- Group procurement (raw product, supplies)
- Processing (HHP, fillet/packaging lines and other heavily capitalized operations)

IV. Educational programs / implementation assistance
- Product and process development workshops
- Marketing programs
- Develop printed and electronic media, website

APPENDIX IV

September 23, 2003

Improving Crab Industry Profitability through Product and Process Improvement

A proposal to the Maryland Department of Natural Resources for funding under U.S. Fisheries Disasters legislation, appropriated to the U.S. Department of Commerce, 2003

Quality Improvement

Two recent initiatives identified impediments to the future sustainability of the seafood industry, including blue crab. One of these offers a national perspective; the other specifically targets the Maryland industry. The National Sea Grant Program released a detailed white paper entitled, "Ensuring Global Competitiveness of the U.S. Seafood Industry". In 2002, the Maryland Legislature established the "Task Force to Study the Economic Development of the Maryland Seafood and Aquaculture Industries." Both work groups consisted of industry, academic and government leaders who identified quality concerns and the near absence of technology as major competitive disadvantages for our industry.

Most food companies generate up to half of their profits from products that have been on the market for less than five years. Crabmeat products are processed and marketed today much as they were 40 years ago. Innovative processing, packaging and marketing strategies are needed to improve product quality, control costs and meet changing customer requirements. Process/product development and demonstration projects with industry (primary and secondary processing, use of convenience packaging, etc.) are expected to provide a significant step towards adoption of technologies, improved margins and market expansion. Key to success will be the active involvement of crab processors and seafood industry suppliers, with technical and marketing support from Maryland universities and agencies.

State Testing Program

In 1991 the Maryland Crabmeat Quality Assurance Program (MCQAP) was established by the crab processing industry (Chesapeake Bay Seafood Industries Association) in conjunction with the Maryland Department of Agriculture and the University of Maryland Sea Grant Extension program. Sanitation audits and process verification studies are conducted in crabmeat processing plants. This information allows processors to identify procedures that most effectively control spoilage and pathogenic bacteria. Crabmeat processors participate voluntarily and undergo detailed evaluation beyond the regular inspection protocol performed by state and federal health regulators. In recent years, program participants significantly improved sanitation controls overall, resulting in products of improved microbiological quality.

Under this program, participating crabmeat processors have the privilege of exclusive use of the Maryland fresh cup and pasteurized can. The distinctive label identifies product packed under the quality program. Although consistent labeling and product recognition

is achieved by this program, the industry now needs to add product quality features to this program to address concerns expressed by buyers and consumers.

Objectives

The projects listed below target quality and marketing needs determined by Maryland crab and crabmeat suppliers and commercial buyers. They are not research studies in the usual sense but applied projects to develop the necessary procedures and infrastructure not currently in place. The projects will be conducted by and with crab industry and food industry suppliers. They are expected to significantly broaden the services and effectiveness of the MCQAP.

Reduce Shell Content: Domestic crabmeat generally contains more shell than does imported crabmeat. At times, imported crabmeat actually sells at a premium to locally produced crabmeat. Shell is a major reason for this, despite the consensus in the marketplace that domestic products possess superior flavor. Foreign suppliers achieve shell-free product through scrupulous, labor-intensive, inspection which is not economically feasible in domestic plants. Computer machine vision (reflected light and x-ray) are commercially available for identifying and removing defects in foods, including shell pieces. Initial contact with suppliers of this equipment indicate that detection technologies exist but some modification of existing equipment is needed for removing the shell once detected.

- Identify/refine machine vision equipment – Phase 1
- Develop shell removal system to interface with above – Phase 1
- Purchase and set-up commercial line – Phase 2

Add Value: Methods are needed for adding value to traditional blue crab products. Most value comes from the larger pieces of crabmeat (jumbo lump) although approximately 60-70 percent of the meat removed from the shell is less expensive "special" and "claw" grades. The value of these grades could be increased through the use of technologies that restructure shredded crabmeat to form larger pieces. Traditional methods used to restructure red meat and poultry products (boneless ham, for example) are not suitable since crabs are cooked prior to meat removal. The resulting meat is heat denatured and requires the use of binders. Preliminary studies with cold-set binders are very encouraging. University faculty experienced with these ingredient systems will work with ingredient companies and forming equipment manufacturers to develop a system for commercial use.

- Optimize binder and forming systems – Phase 1
- Produce trial molds – Phase 1
- Purchase/rent small former – Phase 2

State Testing Program: Product quality standards will be added to the program to address concerns expressed by buyers and consumers. These will include establishing parameters for shell content and piece size (grade standards).

- Draft standards and field test them in plants – Phase 1
- Conduct industry training – Phase 1

• Implement standards under the Crabmeat Quality Assurance Program – Phase 2

Packaging: For many years crabmeat has been sold in either snap-lid plastic containers (fresh crabmeat) or metal cans (pasteurized crabmeat). Consumers are increasingly looking for attractive packaging that connotes quality and provides multiple convenience features (A.E. Sloan, 2003). Packaging is available for marketing fresh crabmeat in vacuum or shrink-wrapped films (recently accepted by FDA) and pasteurization in clear or foil pouches, semi-rigid plastic cans and even glass. The University of Maryland has experience with most of these systems. The attributes of appropriate materials need to be evaluated and procedures established for their use prior to industry adoption.

- Contact packaging manufacturers and conduct preliminary trials – Phase 1
- Develop processing procedures for industry – Phase 1
- Conduct demonstrations and industry training – Phase 2

Reduce Losses: Watermen and processors suffer significant, direct economic losses each year due to crab mortalities post-harvest. Physiological stresses associated with crab handling, temperature and gas exchange are important factors but only minimally considered by current industry practices. Trials are needed to evaluate the effectiveness of humidification, cooling and/or wet storage systems for holding and transporting crabs. Empirical evidence indicates that high humidity refrigeration or even ice-slush submersion may be effective.

- Conduct small-scale trials and document crab survival – Phase 1
- Conduct commercial scale demonstrations and industry training – Phase 2

References

National Sea Grant Program. 2003. Ensuring Global Competitiveness of the U.S. Seafood Industry: A National Sea Grant Initiative, TAMU-SG-02-604, 20pp.

Sloan, A. E. 2003. Top 10 trends to watch and work on: 2003. Food Technology 57 (4): 30-50.

APPENDIX V

MARYLAND AQUACULTURE AND SEAFOOD TASK FORCE
DRAFT REPORT
STATUS AND ECONOMIC POTENTIAL OF AQUACULTURE IN MARYLAND

Andy Lazur, Karl Roscher

October 7, 2003

INDUSTRY BACKGROUND AND STATUS:

Maryland, dominated by the Chesapeake Bay and its watershed system, has historically been a leader in seafood production. Today, with demand generated by the decline of worldwide fish stocks, aquaculture has become the fastest agricultural growth industry (est. 10% annual growth). Within the U.S., the value of aquaculture products sold has risen from $45 million in 1974 to over $978 million in 1998 (USDA). Unfortunately, the Maryland industry has not kept pace with this growth. Maryland aquaculture production and sales have significantly declined since the food fish production sector of the industry collapsed in the late 1990's.

Maryland aquafarmers currently raise a wide variety of products, including food fish, sport fish, mollusks, crustaceans, bait fish, algae, ornamental fish and aquatic plants. These products have generated income of nearly $5 million to Maryland growers in 2001. Consumer interest in water gardening has made sales of aquatic plants and ornamental fish the largest segment of aquaculture production, worth nearly $3.5 million. Growers also produced $500,000 worth of finfish and $160,000 of shellfish. Tilapia is Maryland's number one food fish in terms of production and sales. Largemouth bass, catfish, trout, hybrid striped bass, bluegill, perch, oysters and clams are also grown commercially in the state. Growers use a variety of culture methods to raise their product including recirculating systems, ponds, and flow-thru systems. Most Maryland growers sell their products live, directly to consumers, wholesalers and retailers. In addition there are over 30 schools, non-profits and government agencies which raise products for research, education and stock restoration.

The Maryland aquaculture industry can be characterized as an emerging industry, experiencing growing pains and challenges. The state industry has been based largely on small farm production of ornamental fish and aquatic plants, Oysters, Clams, Hybrid Striped Bass, Catfish, Tilapia, and various other species. Currently, the state industry is being supported through about 20 commercial aquafarms, yet there are approximately 125 facilities permitted.

Most recent estimates indicate the value of Maryland aquaculture products to be between $4-6 million. While this figure is low compared to historical values and with other aquaculture producing states, it still represents a solid industry base on which to build. Current production represents only a fraction of what the potential for aquaculture development is in our state. Legal, regulatory, and technical limitations, as well as funding availability have impeded aquaculture development in Maryland.

Estimates also project Maryland aquaculture as a $100 million industry if constraints are removed and research and extension efforts fully supported. Maryland has the diverse physiographic regions and natural resources needed to support an array of aquaculture ventures. Coastal Plain, Piedmont and Mountain regions of the state offer unique environmental conditions that are conducive to raising various aquatic species. Climatic variations within these regions, water supplies, and other natural resources provide important infrastructure components for industry success. A variety of aquatic plants and animals could be cultured commercially in Maryland. No one species is appropriate for all situations as a successfully cultured species grown in one area may prove impractical or unprofitable in another application.

Maryland's natural resources, geographical diversity, technology services and proximity to large metropolitan markets, offer advantages to aquafarm ventures. Opportunities exist for traditional farmers looking for alternative forms of agriculture and aquaculture biotechnology to invest in. Aquaculture of high value products is possible for small scale aquafarmers. They will use technology, specialized management techniques, flexible production schedules and access to niche and ethnic markets for business expansion. Small farmers will adapt to changing circumstances to stay competitive in a global economy. A strong commitment to foster aquaculture as a viable, environmentally compatible industry including public sector investment in the industry is, however, critical for success.

Maryland is known for high quality seafood and was once a leading national producer. Increasing demand cannot be met by current forms of traditional fisheries. Aquaculture production can help meet consumer demand with farm-raised products. Proper regulatory direction, financial assistance, education, technology transfer, and marketing can help Maryland once again become competitive in the seafood industry.

FOOD FISH

Some Maryland aquafarmers have been successful growing species that target specialty niche markets. These markets can sometimes yield a return that is high enough to support small farm production. However, future investment in this form of production will be limited by market size, demand, and the ability of these aquafarmers to raise products at increasingly competitive prices.

Due to the higher cost of production as a result of environmental limitations and the increased use of recirculating system technology, future expansion in the food fish sector of the industry will be focused on the culture of higher valued species such as saltwater finfish (Cobia, Flounder, Redfish, Sea Bass, Snapper, Sea Bream, and Sturgeon).

Advances in technology related to the culture of these species must occur before this type of aquafarming is viewed as an economically feasible part of the industry. Industry driven research and development projects in production system designs, spawning and hatchery techniques, feed formulations, and aquatic animal health will support advancement in this form of aquaculture. In all cases, projects verifying production, market and economic

feasibility are an essential first step to determine true potential and minimize risk to investors.

AQUATIC PLANTS

Aquatic plants are grown commercially for food, aquariums, water gardens, waste and storm water management and for wetlands restoration projects. In the last decade, a national multi-million dollar industry that services and supplies water gardens has developed. Water gardens have become very popular in residential areas where individuals have large discretionary incomes. Water gardens are popular because they provide the modern urban or suburban dweller with a private and relaxing backyard environment.

These new urban and suburban residential markets may offer future opportunities for Maryland water farming entrepreneurs. Maryland has the potential to expand its aquatic plant production as interest in water gardening grows and wetland mitigation/restoration increases. Research into the nutritional needs of aquatic plants and production methods for alternative plant species including SAV, would help support the needs of a growing industry.

ORNAMENTAL FISH

Interest in growing ornamental fish has expanded in the aquaculture industry. Currently, much of the production is found in southern states, such as Florida. Growth potential of ornamental fish culture is significant and current market demand exceeds local production. There are two categories of cultured ornamental fish. Cool water species, which are mainly comprised of Goldfish, Koi, and Golden Orfe and warm water tropical species. Tropical species, both marine and freshwater are reared primarily in aquaria, whereas cool water fish are raised in aquaria and outdoor ponds. In temperate regions of the U.S., the production technology for cool water fish is relatively simple. Spawning and rearing usually takes place in outdoor ponds and harvest of market size fish can be attained within two years. Capitalization of a project is comparatively small compared to other aquaculture grow-out projects and the technology is already well established. Ornamental fish potentially offer the greatest economic return of fish species.
The 1998 Census for Aquaculture reported that there were 345 ornamental fish growers in the U.S., generating a total of $69 million in sales. Florida dominated the domestic ornamental fish industry with 81% of total sales. The ornamental fish industry is one of two non-food fish production sectors, the other being bait fish.

After declining over the last several years, U.S. exports of ornamental fish have begun to show a small increase in value to 10.8 million in 1999. Canada continues to be the largest market for U.S. grown ornamental fish. Exports to other countries have decreased in the last several years due to the economic instability in a number of Asian markets, which include Singapore, Hong Kong and Japan. Imports of ornamental fish have also been declining over the last several years, but it is unclear if U.S. demand here has slacked off or domestic growers have been increasing production to meet market demand.

Saltwater species targeted for the ornamental trade have potential as well. Though competition from other states like Florida is keen, there is the possibility for researching the market demand for various species.
Approximately 500-700 marine ornamental fish and 300 invertebrate species (fish, sponges, sea anemones, corals, mollusks and crustaceans) are wild caught and sold into the global trade. Currently only about 25 of those can be successfully farms raised economically. Due to advances in aquarium keeping, "mini" reef aquariums are now possible and are one of the fastest growing components of the hobby. In comparison to freshwater fish tanks, mini reef aquariums require live rock and sand, corals, clams and other reef invertebrates to properly function as captive ecosystems. All of these factors have accelerated the efforts to culture ornamental marine species for the aquarium trade.

BAIT FISH

Bait fish are an important component of the recreational fisheries industry. Principal bait fish used by the sport fishing sector include fathead minnows, golden shiners, goldfish, and a few other native and ornamental species. Of the three bait fish species the golden shiner and the fathead minnow are probably the most widely used in the recreational fishing industry. These species would have the greatest production and market potential for Maryland growers. Fathead minnows are also recommended for pond stocking as forage fish for other game fish species, especially in recreational ponds. They are also bait for larger sport fish. Fathead minnows are usually raised in ponds.

Opportunities for new start-up bait fish culture may be limited in Maryland due to requirements for location, land costs and other financial constraints. But because of current demand, there may be potential to grow bait fish through incorporating small culture systems into existing facilities. Bait aquaculture potentially offers greater returns ($4-10/lb) than food species ($.70-3.50/lb). Market opportunities, especially marine species traditionally supplied by wild sources, are established and expanding due to increasing consumer demand.

SPORT FISH

Aquaculture of sport fish occurs in Maryland on a limited basis. Currently there are only a few farms that produce sport fish, primarily for stocking purposes. But there is potential for Maryland to accelerate its sport fish culture production. Evidence suggests there is a growing demand for these species as supplemental stocking for recreation purposes in ponds and lakes. Due to a lack of local production, most recreational pond owners purchase stockers from other states including Arkansas, North Carolina, and Pennsylvania. Sport fish raised on aquafarms can also be sold to fee-fishing operations to restock these ponds.

Primary sport fish in demand are the Largemouth Bass, Black Crappie, Bluegill, Hybrid Striped Bass, and other sunfish hybrids. Sport fish can only be grown and sold for stocking into private ponds. Indications are that sport fish can also be integrated in grow-out production with other species of food fish such as Channel Catfish, Hybrid Striped Bass, etc.

MARICULTURE

For coastal regions where traditional fisheries and related employment may be in decline, development of marine aquaculture can provide jobs that maintain links to traditional lifestyles. Marine aquaculture may also provide an industry base for rejuvenating the local seafood sector. Maryland's Eastern Shore region represents an area with good potential for marine aquaculture development primarily because of the abundance of Coastal Bay areas and tributaries, and limited high-density developments that can be found in other coastal regions.

Because of Maryland's traditional seafood history with the Chesapeake Bay, most of the attention for marine species is targeted towards mollusks. Oysters and clams have long been staples of Maryland's cuisine and economy. Currently these mollusks are farm raised for food and seed stock. Great potential exists for shellfish aquaculture in Maryland due to the collapse of the traditional oyster fishery and the increased demand for hard and soft clams. Areas available within the Chesapeake and Atlantic coastal bay regions that can be utilized for shellfish aquaculture must be expanded to include new leases within the water column and on bottom in order for this sector of the industry to reach its potential.

The cultivation of marine fishes in Maryland also has potential to provide the industry with additional business opportunity. Finfish species with potential in Maryland include summer flounder, red drum, cobia, black sea bass, and weakfish. In most cases, these species are attractive to culture because of their current high market value, especially in niche markets, and reduction in wild stocks. Commercial culture technology is available on marine species that may be applicable in a Maryland mariculture industry. It is not possible to list all species that may have potential for marine culture because such limits cannot be assessed for future development projects.

FRESH WATER AND MARINE STOCK ENHANCEMENT

In the U.S., the first fish hatcheries were part of the U.S. Fish and Wildlife Service National Fish Hatchery System. For almost 130 years they have been raising fish for restocking to provide for declining native fish species and for recreational purposes. Techniques developed by those hatcheries have led Maryland into developing its own successful state fish hatchery system, with similar objectives.

Today, with the declines in water quality, suitable habitat, and fishery stocks there is potential for the production of fish, shellfish, and aquatic plants for restocking and repletion efforts in fresh water and marine environments. Should the Maryland Department of Natural Resources identify an accelerated need for stock enhancement of declining aquatic species, Maryland's private aquaculture industry could produce fingerlings, shellfish seed, aquatic plant seedlings, etc., for restoration projects. This may offer a new avenue of opportunity for existing farms, or those seeking new aquaculture ventures.

ECONOMIC POTENTIAL:

Although relatively small scale, Maryland's aquaculture industry is diverse with production of many species in numerous commodity groups: biotechnology products, fish (ornamental and food), plants, and shellfish. The degree of economic potential of these various products varies among commodities, type of market outlet and will fluctuate over time due to market shifts from competition and other factors. Interestingly, food fish is often what people associate with aquaculture, yet due to competition with low cost foreign imports and the inherent high cost of production, wholesale sales of food fish tends to have the lowest profit potential of the various commodities. Despite a significant market demand for fish, culturists must focus on new market outlets and strategies to maximize profit or consider diversifying into higher value species or commodities. A summary of the economic potential of the various aquaculture commodities in Maryland is presented in Table 1. Rather than listing a whole host of individual species in which economic potential may vary relatively slightly, attention to commodities, their market types and current degree of technology is warranted since most species have some degree of economic potential in Maryland and in order to focus on the fundamental issue of how Maryland can foster and facilitate aquaculture development.

Table 1. Overview of the potential for economic viability of the major aquaculture commodities, market outlets and reference to the degree of current knowledge and technology within the commodity.

Commodity/Species	**Market type**	**Potential for economic viability**	**Status of current production technology**
Aquatic Plants (ornamental)	wholesale/retail	high	moderate
Aquatic Plants (restoration)	wholesale	high	limited
Bait (fish and other)	wholesale	high	moderate
Biotechnology products	laboratory/bioassay specimens	moderate to high	moderate
	medical/pharmaceutical	high	limited
Food fish	processed for wholesale	low	extensive
	live sales	low to moderate	moderate
	recreation or pond stocking	moderate to high	moderate
Ornamental fish (freshwater)	wholesale	high	moderate
Ornamental fish (marine)	wholesale	high	limited
Shellfish	live wholesale	low to moderate	moderate
	restoration	moderate	moderate to high

This list is designed to provide a base of understanding of where opportunities lie and help identify needs that should be addressed to facilitate development. Basically, all

commodities have potential for growth in Maryland and the level of established production practices and technology varies with species/market opportunities. Those with limited to moderate level of current technology, require additional research and demonstration to solve issues and impediments, thus providing for increased industry expansion. In review of the commodities and status of technology, there exists several common factors, which with addressing through strategic action, can greatly facilitate development and a more sustainable economic base.

Specific actions needed to facilitate development in all of the aquaculture commodities include:

- ✓ Establish Maryland as a state which is committed to supporting environmentally sound, aquaculture development, recognizing the need for resource allocation.
- ✓ Develop the legislative, regulatory, and business support framework and climate which puts Maryland at a competitive advantage for private investment.
- ✓ Streamline regulatory process using other states, i.e. Florida, Alaska, etc. as a model, including a one-stop shop process
- ✓ Establish an industry aquaculture group to identify priority issues and communicate to lead agency and legislature
- ✓ Fund and conduct demonstration projects to solve technology issues that retard industry growth through cooperative efforts.
- ✓ Expand education efforts to include programs for potential culturists, lenders and business leaders on economically feasible aquaculture development.
- ✓ Develop a certification program for aquaculture producers.

APPENDIX VI

Subcommittee: **Assess the Economic, Technical, and Educational Requirements for Enhancement of the Maryland Aquaculture Industry**

Members: **Donald Webster and Fred Wheaton, University of Maryland**
Steve Gordon, Aquaculture Industry
Jon Van Alstine, Commercial Waterman

I. ECONOMIC REQUIREMENTS

Public Sector Financing

The primary economic requirement for development of an aquaculture business is the same as for any other commercial venture - the need for affordable capital for start-up and development until a sufficient cash flow can be developed to sustain the business. It is clear that this can best be achieved by private sector capital sources.

In aquaculture there have been many failures. This is typical of a new industry that is not yet fully developed. The rate of default on state supported loans has been one hundred percent (100%) during the life of the Maryland Seafood and Aquaculture Loan Fund program. Many of these loans should likely not have been made. They provided capital to unproven and risky technology that was not matched by market conditions. The most successful aquaculture businesses in Maryland have been those that started small and built up over a period of years as technical skills were gained and market share increased by the founding entrepreneurs.

A problem that seems endemic in the aquaculture industry is a lack of basic business skills by many seeking entry. Knowledge about fixed and variable costs, cash flow, accounts receivable and payable, return to investment and other important economic indicators is missing in many potential producers. In short, few operators seem to have a firm idea of the value of their product as it leaves the farm.

In recent times, private capital has been available at affordable rates. This differs from the past when interest rates were high and loan repayment could break a business. Government programs that were initiated to spur new industries often seem destined to lose money. These tend to fund those who should often not be in business and frequently prop up uneconomical operations until they become so far in debt that they must default.

One program that has successfully helped startup aquaculture businesses is the Maryland Industrial Partnership (MIPS) program. This program teams scientists with businesses to solve production problems or conduct applied research with immediate application. While this program is not specific to aquaculture, this agency of the University of Maryland's Technology Extension Service (TES) has assisted several aquaculture projects in recent years. It does not provide startup capital but directs funds to scientists for research to get a business the help it needs to operate efficiently and become productive and profitable.

Economic Impact Tracking

The State of Maryland needs the ability to track the current status and future development of the aquaculture industry in order to measure its growth and expansion.

This is critical for government funds allocated to development to be assessed for cost and benefit and to provide accountability for the public.

A system to accurately gauge the impact of the industry by gathering key economic data must be instituted and kept timely by state agencies. The primary agency responsible for this should be the Maryland Department of Agriculture.

Recommendations:

- The Maryland Department of Agriculture (MDA) will gather accurate economic data on the Maryland aquaculture industry in a timely manner, coordinating wherever possible with existing federal surveys and those of other states and agencies to ensure compatibility.
- The Office of Aquaculture Coordinator (OAC), in cooperation with University of Maryland Cooperative Extension (UMCE) will investigate state and federal programs providing financial assistance to aquaculture businesses for development and provide this information to aquaculturists through print and electronic means and individual consultation.
- UMCE will consult with the financial community to identify problems in providing funding for aquaculture that must be overcome and to gauge the attitude of bankers towards private sector aquaculture loans and conduct seminars for the lending community so that they can judge aquaculture loan applications.
- The Maryland Aquaculture Coordinating Council (MACC) will organize meetings with industry representatives and the financial community to identify constraints to development that are attributable to lack of financial support. They shall use these results to note gaps between available financial institutions and needs of the industry as a continuing project.
- The OAC will develop recommended solutions to industry financing problems that can be addressed through educational, regulatory, or legislative means and make these known to the Maryland legislative and executive branches of government.

II. TECHNICAL REQUIREMENTS

Research Support

Many support units currently exist within the University System of Maryland (USM) that conduct research and provide service on aquaculture-related topics. Among these are:

- Center for Environmental Science (CES):
    - The Horn Point Lab (HPL) at Cambridge has operated a commercial size production facility for shellfish and finfish for many years. A new research and officer complex will increase production and includes facilities for research into shellfish, finfish, and aquatic plants. Finfish and shellfish specialists located at HPL have extension appointments with the University and are charged with working directly with industry.
    - The Chesapeake Biological Lab (CBL) at Solomons conducts research with aquaculture application including fish biology and diseases of the hard clam.

- University of Maryland Eastern Shore (UMES) at Princess Anne conducts research and demonstration projects on recirculating aquaculture systems (RAS), tilapia, and fish nutrition. The institution is also charged with working with part-time and non-traditional farming audiences through their Small Farms Institute.
- Center of Marine Biotechnology (COMB) at Baltimore's Inner Harbor conducts research on fish and crustacean production as well as bacteria and biotechnology. Current projects include commercial production of sea bass and the Blue Crab.
- The University of Maryland College Park (AGNR/UMCP) includes several units with ongoing interest in aquaculture topics:
    - The College of Agriculture and Natural Resources has included many projects during the years that have a direct impact upon aquaculture development.
        - The Department of Biological Resources Engineering that has provided development of components and systems for recirculation aquaculture, as well as a suite of projects dealing with seafood industry problems.
        - The Department of Animal Science conducts research on the breeding and selection and off-season spawning of striped bass and has been a leading group with their research being applied to a successfully developing industry nationwide.
        - The Maryland Agricultural Experiment Station (MAES) has provided funding for solving defined aquaculture problems including commercialization of striped bass and its hybrids and the development of recirculating aquaculture systems. These projects have been conducted with oversight of an Aquaculture Advisory Committee that includes representation from industry, research, and extension.
- Fish Pathology Lab located at the Regional Animal Health Laboratory in the Avrum Gudelski Veterinary Science Building at UMCP conducts investigations on fish disease including identification and control and works with extension specialists to provide educational training programs for the aquaculture industry.

These units directly support various segments of the aquaculture industry. Additionally, other institutions within the University System of Maryland, as well as departments within other campuses, have worked on topics of interest to the industry. The size of the USM shows that there is sufficient expertise available to engage problems that the industry is facing. This could be developed through increased interaction between scientists and industry, as well as by providing funding for application research.

To begin the process of sharing information on programs, facilities, and industry needs a University System of Maryland Aquaculture Symposium was held during August 2004. The symposium helped identify those within the state who have expertise in industry problems, as well as those who are interested in assisting with programs to develop successful businesses. The conference was supported by grants from the Maryland Agricultural Experiment Station and the Maryland Department of Agriculture, thereby demonstrating the joint interest between institutions and agencies in the development of this industry.

Outreach and Extension Education

Successful aquaculture requires the obtaining of technical skills to properly operate production systems and to properly manage a business. The Sea Grant Extension Program (SGEP) is administered by University of Maryland Cooperative Extension to provide off campus adult educational programs in this regard. The faculty has delivered educational programs to the industry for many years for developing production skills and has a national reputation for quality educational activities. These have included evening lectures, daylong workshops and demonstrations, multi-day conferences, and week-long short courses in highly technical subjects. In addition, the SGEP currently provides the newsletter *Maryland Aquafarmer* free of charge to the industry and other interested parties through print and electronic means.

In August 2003, the SGEP, in cooperation with the Maryland Agricultural Experiment Station and the Maryland Department of Agriculture, organized and conducted a two-day Maryland Aquaculture Development Conference. This was attended by those interested in industry expansion. During 2004, the USM Aquaculture Symposium defined industry problems to stimulate research in overcoming impediments for state producers.

The SGEP has ten faculty members who work in various aspects of aquaculture, seafood technology, and marine science related areas. They are available to address areas of concern for industry. The faculty uses a variety of means to interact with producers and scientists including individual consultation, group meetings, large-scale conferences and workshops, and written and electronic publications.

Recommendations:

- The SGEP will be provided funding to conduct annual conferences for assistance of the aquaculture industry in obtaining the latest information on production topics and to interest research faculty of the USM in solving defined industry problems.
- The Maryland Aquaculture Coordinating Council will annually provide five defined areas of research required for solution of industry problems and will provide oversight to the Maryland Legislature on the status of research for industry development.
- The State of Maryland will provide annual research support for funding projects to address defined industry problems. The MAES will administer these funds with guidance from their Aquaculture Advisory Committee.
- The State of Maryland will provide $100,000 annually for development projects initiated by industry to solve production, processing and handling problems. Funds will be administered by Maryland Cooperative Extension. Individual grants to producers will be limited to $1,000 each and be used only for equipment and supplies, not for labor or management. Applications will be reviewed by the MCE and the OAC. Information, other than marketing and financial, resulting from these grants will become public domain.
- The State of Maryland will direct MCE to provide extension educational programs and support materials to meet the training needs of Maryland aquaculture producers and will receive dedicated funding for this purpose. Certification programs required by the State of Maryland for aquaculture producers will be conducted by MCE.

Annual reports will be submitted that assess impacts and results of these educational programs.

III. EDUCATIONAL REQUIREMENTS

Education about aquaculture and its use in school systems has been pioneered in Maryland, where it has been used to teach a variety of subjects. Among these are biology, chemistry, nutrition, as well as developing design, construction, and business skills. There is an organized cadre of teachers within the state who regularly share information through extension newsletters and websites.

Industry needs workers with the skills necessary to operate the systems and equipment used for production. In many cases the skills needed in aquaculture are those necessary for any successful farming operation. Woodworking, plumbing, electrical, and mechanical talents are in demand for both finfish and shellfish production. Other more complex skills such as spawning techniques, algae production, larval care, and fingerling growth and transport may also be necessary, depending upon the needs of the particular business.

Kindergarten through eighth grade

Aquaculture experiential programs should be injected into elementary school curricula where possible as a means of teaching science and mathematical subjects. While some programs currently exist, more could be done by enhancing funding and allocating new resources to existing programs. In developing programs, teachers should be provided with the best technical information possible on production systems and a means of tracking progress of programs should be refined.

High school

Most aquaculture education programs have been delivered at the middle and high school years. Many Maryland school systems have excellent recirculation aquaculture production systems in place and are using these for production of fish. Some work in concert with the Maryland Department of Natural Resources (MDNR) to raise fish for enhancement and restoration stocking, teaching children both technical skills while developing in them an appreciation of restoration ecology. Other schools produce fish like tilapia that may be used for consumption.

Maryland Extension has developed a network of high school teachers who use aquaculture for science instruction. As part of these efforts, there are annual in-service training programs for teachers where they can share information with each other while building their own competencies in aquaculture related subjects. This program also involves teachers in the publication of a newsletter and website used for program support and information sharing.

Technical / Vocational school

Skills developed from vocational-technical education would serve well in operating an aquaculture business. Some counties have agriculture programs providing students with manual skills necessary for farming operations. One program, formerly within Somerset County, taught skills necessary for becoming either a watermen or an

aquaculturist. While the declining nature of the seafood industry and the small size of the aquaculture industry would not support many efforts of this type, targeted pilot programs could provide a base for future industry development.

Community college

Community colleges have long been the backbone of Maryland's technical training. They provide training in a range of subjects for businesses requiring competent personnel for staffing. This has been demonstrated in the medical and legal fields, and in aviation, metal work, drafting, and other technical fields.

There has been no clear indication of programs being developed to support aquaculture at this point because the industry is small and cannot provide a guarantee of employment for those obtaining the skills. In most cases, those with skill in woodworking, metal work, or similar trades would find those useful in many areas of aquaculture.

In the event the industry builds to the point where it would require more technically skilled workers than could be trained through extension programs, the community college system would be the logical place for training. It is envisioned that there would be some community colleges that could integrate courses like water quality management into their course schedule with little trouble.

College – Undergraduate level

There are no dedicated programs in Maryland for aquaculture at the undergraduate level. Several institutions offer courses involving aquaculture or reference it within other courses. At present, those who are interested in aquaculture as a career path do so by majoring in biology or engineering.

College – Graduate level

There are several programs by which someone interested in aquaculture can obtain advanced knowledge. Many graduate students have gone on to careers in aquaculture related fields through successfully completing courses of study at Maryland institutions.

The Department of Biological Resources Engineering at UMCP has an aquaculture option at both the Masters and Ph. D. levels and has a reputation for producing excellent students.

The Marine Environmental and Estuarine Science (MEES) program is a multi-campus degree program within the USM. It includes degree options at both the Masters and Ph.D. level. Several of these include concentrations in aquaculture and significant faculty involvement is found in the field so that students are provided with excellent guidance.

Extension and outreach

Extension programs are available to the industry through a range of activities conducted by Maryland Cooperative Extension. During the 1990s program faculty conducted fifty to sixty programs annually on aquaculture topics. Extension provides guidance to those interested in assessing potential for new businesses. Extension programs provide skills potential entrants need to obtain information and weigh

alternatives. Additionally, extension specialists teach programs to provide skills to beginning and existing operators of aquaculture businesses.

University of Maryland Cooperative Extension, through its Sea Grant Extension Program, conducts formal extension programs in an ongoing basis. In addition, faculty located throughout the USM provides outreach that may also directly benefit the industry.

Recommendations:

- Producer members of the aquaculture industry will serve on a committee on Education and Training Needs to survey the industry and assess: a/ skills needed by producers; b/ current availability of trained labor in the marketplace; c/ recommendations on education needed for current and projected industry growth. This should be a subcommittee of the Maryland Aquaculture Coordinating Council (MACC) and should report its findings to that body on a regular basis.
- The MCE will assess the need for outreach and extension training through interaction with the MACC and shall provide programs where necessary and on defined topics to meet these needs, as well as providing evaluation of outcomes to the MAAC for oversight.
- Faculty of the University System of Maryland (USM) and community and private colleges will be invited to attend annual aquaculture symposia to learn the status and extent of the industry and research needs and opportunities.
- MCE will continue to involve Maryland science teachers in the use of aquaculture as a teaching tool and will continue to disseminate information on programs and methods through printed and electronic means.

APPENDIX VII

MARYLAND AQUACULTURE AND SEAFOOD TASK FORCE
DRAFT REPORT
MECHANISMS TO ENHANCE COORDINATION AMONG AGENCIES AND THE UNIVERSITY OF MARYLAND TO STRENGTHEN THE AQUACULTURE INDUSTRY

Fred Wheaton, Karl Roscher, Yonathan Zohar

October 7, 2003

Below are a few examples of various entities impacting on the aquaculture industry in Maryland.

1. State Agencies
    a. University of Maryland
    b. Department of Agriculture
    c. Department of Economic Development
    d. Department of Health and Human Hygiene
    e. Department of Environment

2. Federal Agencies
    a. EPA
    b. Department of Commerce
    c. Department of Agriculture
    d. Corps of Engineers
    e. Department of Homeland Security
    d. Department of Defense

3. Stakeholder Organizations
    1. Chesapeake Bay Foundation
    2. Tributary teams
    3. Smithsonian Institution
    4. Others

Within each agency there may be several divisions or sections involved. For example in the University of Maryland Systems the following campuses are involved in aquaculture.

A. UM College Park
B. UM Center for Environmental Science
C. UM Biotechnology Institute
D. UM Eastern Shore
E. UM Baltimore
F. UM Frostburg State

These examples indicate that coordinating within agencies, across agencies, and with other stakeholder groups will be a complicated undertaking. Thus, the committee has taken the approach of suggesting mechanisms that will enhance and facilitate coordination of agencies and organizations having an interest in or impact on the aquaculture industry.

The committee proposes the following strategy and recommends that any legislative action proposed by the Aquaculture Workgroup should include the establishment of two coordinating committees identified below.

The ***Joint Legislative Committee on Aquaculture*** (JLCA) will set the objectives of the state aquaculture program within the guidelines defined by the legislature and will exercise executive oversight of the Aquaculture Coordinating Committee. The JLCA will be a policy setting group and will mediate any disagreements between agencies relative to jurisdiction, regulations, or other matters of conflict related to aquaculture and the aquaculture industry. This committee will also initiate legislative programs for aquaculture development activities.

The second group, the ***Aquaculture Coordinating Committee*** (ACC) will consist of representatives that are appointed by the various agency secretaries, having an interest in or regulatory responsibilities for aquaculture in Maryland. This committee will also include representatives of federal agencies with aquaculture oversight that are designated through cooperative agreements. The Aquaculture Coordinating Committee will be a working level group that will act on aquaculture related decisions and will be chaired by the Aquaculture Coordinator at the Maryland Department of Agriculture. This group will be the recognized authority for granting aquaculture permits and disseminating information on regulatory requirements. For example, an individual interested in getting an aquaculture permit will apply to this group and the Chair will insure that all of the committee members have had the opportunity to review the application and make comments within 120 days. The ACC will then grant or deny the permit.

Technical assistance will continue to be provided to growers and others interested in aquaculture by the University of Maryland Extension Program. The Department of Agriculture and Extension will work directly with industry to facilitate and promote aquaculture. Because the ACC will function as a regulatory committee, the University of Maryland will serve as the technical advisor to the ACC, but will not be involved in regulatory actions. This arrangement will maintain the University's objectivity so it can effectively work with growers, processors, and others in the industry. The University of Maryland, Dean of the College of Agriculture and Natural Resources, will appoint someone from the university to coordinate technical assistance for the ACC. This individual will be responsible for securing technical advisors from the University System of Maryland with the scientific expertise needed to assist the ACC in the decision making process.

Best management practices for the various sectors of the aquaculture industry will be developed. Best management practices need to be developed by the ACC, representatives

of industry, the University System of Maryland, and other stakeholder organizations working cooperatively. Legislative action must establish that best management practices will be followed in the aquaculture industry. Legislation should also indicate how the best management practices will be approved, how often they should be reviewed, and how they will be implemented.

The aquaculture industry in Maryland currently does not speak with a united voice. There are many reasons for this, one of the largest being the diversity of aquaculture products raised and sold in Maryland. However, the industry must develop a vehicle to speak with a united voice. This vehicle is something the industry must develop and it could take a variety of forms including the Maryland Aquaculture Association. By establishing a functional association, industry needs in legislation, research, extension, marketing, and other areas could be more effectively communicated. These needs must then be prioritized and agreed upon by a majority of industry members. The association could then take it to the ACC which would make recommendations on how to proceed in resolving the issues.

This is a preliminary report from the committee on coordination of aquaculture activities in state agencies and the University of Maryland and may be modified at a later date.

APPENDIX VIII

Aquaculture Task Force Subgroup
Draft Report and Suggested Plan of Action
December 2003

Charge: "Study and recommend innovative methods for aquaculture to target commercial production and restoration of fisheries"

Group members: Dr. Yonathan Zohar, Delegate Dan Morhaim, Jeff Zellmer, Aden King

It is clear that for aquaculture to become a more intensive, cost-efficient, sustainable and viable industry, and better able to replace the dwindling local and national fisheries, it has to become more modern and innovative. Maryland is ideally situated to take the lead in this effort. To meet the above challenges, the aquaculture industry will have to rely on innovative approaches and technologies based on recent and anticipated advances in the sciences of biology and engineering. A dedicated, sustained collaborative effort and spirit of cooperation between government, industry and academia must exist in order to most efficiently and expeditiously develop and implement innovative methods and technologies in aquaculture. The State of Maryland must allocate specific funding to enable a strong, enduring academia-industry partnership in aquaculture. In addition, government and university extension services need to assume a proactive role in facilitating and coordinating such collaborations and the transfer of technology from academia to industry.

The following actions are suggested to develop efficient mechanisms for implementing innovative technologies in Maryland Aquaculture and Restoration of Fisheries:

An Aquaculture Technical Advisory Committee (ATAC) should be established. This committee will be appointed by the Secretary of MDA and will consist of 7 members, representing the private sector (2 members), the academic community (2 members), environmental advocates (2 members) and from the Maryland Department of Agriculture (1 member).

The ATAC will be charged with and be responsible for the following activities:

1. Identify and prioritize the major bottlenecks to the development of intensive, cost-efficient and sustainable finfish and shellfish aquaculture in the State of Maryland and in the US that require input through biotechnical innovations and research and development. Areas to be considered include (but are not limited to): broodstock management and seed production; hatchery (larval) and nursery production; grow-out technologies, growth and development; feed and nutrition; disease diagnostics and control; biosecurity and containment; environmental compatibility; processing technologies; system engineering; and education, training and outreach.

2. Identify and prioritize innovative approaches and methods to remove current identifiable bottlenecks, based on biological and engineering sciences. Assess the role of modern biology and biotechnology in addressing the identified hurdles.

3. Identify and prioritize innovative approaches to help Aquaculture become an economic development engine, increase production, profitability and create new jobs.

4. Recommend mechanisms to facilitate the rapid development of innovative technologies and their implementation in the industry, including research and development efforts and technology transfer activities.

5. Explore and recommend mechanisms for enhancing interactions between industry and academia, specifically for Maryland (to include the University System of Maryland, Johns Hopkins University, and others). These should include annual industry-academia meetings and workshops as well as funding of academia-industry Research & Development initiatives.

6. Explore the role of the existing extension entities in Maryland and develop strategies for enhanced and proactive extension activities in facilitating and coordinating dialog, cooperation, research and development and technology transfer partnerships between academia and industry.

7. Establish a long-term, revolving State fund to finance research and development and technology transfer and implementation activities. Funding will be allocated based on a competitive process, which will be comprised of a bi-annual request for proposals (RFP) and a peer-review process.

8. On a bi-yearly basis, develop the objectives of the competitive funding process and accordingly compose the RFP. Establish mechanisms for the peer review process, to include external reviewers from industry and from academia. Well established, similar State programs, such as Maryland Industrial Partnerships (MIPS), should be studied and potentially used for the aquaculture effort.

9. Explore and recommend the establishment of training, demonstration and outreach programs that will expose aquaculturists to innovative approaches and technologies and help them with implementation in the industry. USM facilities, programs and extension services should be part of that initiative.

10. Engage in discussions with aquaculture officials from other states and nations and research similar legislations, in order to obtain information and learn from their experiences during the successful achievement (or lack thereof) of the objectives listed in items 1-8 above.

11. To assist the ATAC in making many of the above decisions and choices and in prioritizing R&D and innovation efforts, it is essential to integrate as much input as possible from recognized leading members of both the aquaculture industry and the

academic community nationwide. Consequently, the ATAC should organize a bi-annual meeting which will bring together members of the industry and the scientific community from Maryland and other states to elaborate further on the above objectives and provide additional input on identifying and prioritizing innovative methods and R&D efforts for aquaculture and fisheries advancement and mechanisms for their rapid implementation.

APPENDIX IX

MARYLAND AQUACULTURE AND SEAFOOD TASK FORCE
DRAFT REPORT
METHODS UNDERTAKEN IN OTHER STATES TO DEVELOP THEIR AQUACULTURE INDUSTRIES

Delegate Charles Boutin, Karl Roscher
October 7, 2003

A Maryland Aquaculture Development Conference was held requesting speakers from Alaska, Florida, North Carolina and Virginia to discuss what actions their states have taken to restructure government in support of aquaculture development while maintaining the integrity of regulatory programs.

Although the specific actions taken differed between states, there were parallels that became apparent at the conclusion of the conference. The majority of strategies utilized in support of aquaculture development focused on establishing aquaculture as a priority agricultural activity when making future policy decisions and allocating resources. The benefits that the industry provides including producing food, creating jobs and tax revenue, revitalizing farming and fishing communities, providing for restoration of species and habitat, and supplementing the demand for seafood while commercial fishery stocks recover, are often overlooked when developing the policies and regulations that impact the industry.

As aquaculture grows, impediments must be effectively addressed and supporting programs developed to relieve the pressure that restricts investment, innovation, and expansion. Without taking aggressive action to address these issues the industry will fail to reach its potential. These impediments include but are not limited to:

- Excessive and inadequate regulations
- Multiple agency oversight
- Complicated permitting process
- Lack of coordination within all levels of government
- Environmental impacts
- Land use restrictions
- User group conflicts
- Inadequate funding resources
- Limited industry driven research and development

Policy changes that have become effective tools in promoting growth of aquaculture in various states were identified as:

- Creating a one-stop shop for permitting, hearings and regulatory oversight
- Coordinating policy development through one agency by legislation and inter-agency agreements.
- Developing regulations specific to the aquaculture industry.

- Establishing Best Management Practices.
- Supporting research and development that is industry driven and funded.
- Creating educational and training programs that link aquaculture and commercial fishing.

Specific examples of these actions and recommendations by various states are listed below:

FLORIDA

Florida Aquaculture Policy Act which was created in 1984 and amended every year since that time. Critical components of the act that related to industry development are an industry advisory council, an annual aquaculture development plan, a biennial survey, and a one-stop shop for permitting in the form of the Florida Department of Agriculture, Division of Aquaculture. Developmental assistance to Florida aquaculture is in the form of agency programs to reduce regulatory costs and confusion and to improve the availability of production and technical information.

597.002 Legislative declaration of public policy respecting aquaculture.--The Legislature declares that aquaculture is agriculture and, as such, the Department of Agriculture and Consumer Services shall be the primary agency responsible for regulating aquaculture, any other law to the contrary notwithstanding. The only exceptions are those areas required by federal law, rule, or cooperative agreement to be regulated by another agency. The Legislature declares that, in order to effectively support the growth of aquaculture in this state, there is a need for a state aquaculture plan that will provide for the coordination and prioritization of state aquaculture efforts and the conservation and enhancement of aquatic resources and will provide mechanisms for increasing aquaculture production which may lead to the creation of new industries, job opportunities, income for aquaculturists, and other benefits to the state. The state aquaculture plan shall guide the research and development of the aquaculture industry. Funds designated by the Legislature for aquaculture research and development or for contracting for aquaculture research and development shall be used to address the projects and activities designated in the state aquaculture plan. Any entity receiving legislative funding for aquaculture research and development programs shall report annually to the department all activities related to aquaculture to facilitate coordination and compliance with the state aquaculture plan.

597.003 Powers and duties of the Florida Department of Agriculture and Consumer Services.--

(1) The department is hereby designated as the lead agency in encouraging the development of aquaculture in the state and shall have and exercise the following functions, powers, and duties with regard to aquaculture:

(a) Issue or deny aquaculture certificates that identify aquaculture producers and aquaculture products, and collect all related fees.

(b) Coordinate the development, annual revision, and implementation of a state aquaculture plan. The plan shall include prioritized recommendations for research and development as suggested by the Aquaculture Review Council, the Aquaculture Interagency Coordinating Council, and public and private institutional research, extension, and service programs.

(c) Develop memoranda of agreement, as needed, with the Department of Environmental Protection, the Fish and Wildlife Conservation Commission, the Florida Sea Grant Program, and other groups as provided in the state aquaculture plan.

(d) Provide staff for the Aquaculture Review Council and the Aquaculture Interagency Coordinating Council.

(e) Forward the annually revised state aquaculture plan to the commissioner and to the chairs of the House Committee on Agriculture and Consumer Services and the Senate Committee on Agriculture 1 month prior to submission of the department's legislative budget request to the Governor.

(f) Submit the list of research and development projects proposed to be funded through the department as identified in the state aquaculture plan, along with the department's legislative budget request to the Governor, the President of the Senate, and the Speaker of the House of Representatives. If funded, these projects shall be contracted for by the Division of Aquaculture and shall require public-private partnerships, when appropriate. The contracts shall require a percentage of the profit generated by the project to be deposited into the General Inspection Trust Fund solely for funding aquaculture projects recommended by the Aquaculture Review Council.

(g) Provide developmental assistance to the various sectors of the aquaculture industry as determined in the state aquaculture plan.

(h) Assist persons seeking to engage in aquaculture when applying for the necessary permits and serve as ombudsman to resolve complaints or otherwise resolve problems arising between aquaculture producers and regulatory agencies.

(i) Develop and propose to the Legislature legislation necessary to implement the state aquaculture plan or to otherwise encourage the development of aquaculture in the state.

(j) Issue or deny any license or permit authorized or delegated to the department by the Legislature or through memorandum of understanding with other state or federal agencies that furthers the intent of the Legislature to place the regulation of aquaculture in the department.

(k) Make available state lands and the water column for the purpose of producing aquaculture products when the aquaculture activity is compatible with state resource management goals, environmental protection, and proprietary interest and when such state lands and waters are determined to be suitable for aquaculture development by the

Board of Trustees of the Internal Improvement Trust Fund pursuant to s. 253.68; and be responsible for all saltwater aquaculture activities located on sovereignty submerged land or in the water column above such land and adjacent facilities directly related to the aquaculture activity.

1. The department shall act in cooperation with other state and local agencies and programs to identify and designate sovereignty lands and waters that would be suitable for aquaculture development.

2. The department shall identify and evaluate specific tracts of sovereignty submerged lands and water columns in various areas of the state to determine where such lands and waters are suitable for leasing for aquaculture purposes. Nothing in this subparagraph or subparagraph 1. shall preclude the applicant from applying for sites identified by the applicant.

3. The department shall provide assistance in developing technologies applicable to aquaculture activities, evaluate practicable production alternatives, and provide agreements to develop innovative culture practices.

(l) Act as a clearinghouse for aquaculture applications, and act as a liaison between the Fish and Wildlife Conservation Commission, the Division of State Lands, the Department of Environmental Protection district offices, other divisions within the Department of Environmental Protection, and the water management districts. The Department of Agriculture and Consumer Services shall be responsible for regulating marine aquaculture producers, except as specifically provided herein.

(2) The department may employ such persons as are necessary to perform its duties under this chapter.

OHIO

The Ohio Aquaculture Plan, developed by the Ohio Aquaculture Task Force, was created to identify the needs of the industry and to make recommendations to foster expansion. Nine recommendations were developed for immediate action within the state:

- Initiate a triangle plan for aquaculture in which three aquaculture extension specialists use a team approach to address programming and educational needs.
- Promote aquaculture education by supporting secondary education efforts and college aquaculture programs
- Increase funding for research that focuses on collecting baseline production data.
- Create a state Aquaculture Coordinator position to promote communication among the various agencies, producers, processors, and others.
- Create an Aquaculture Marketing Specialist position within the Ohio Department of Agriculture.
- Develop a voluntary quality assurance program for aquaculture products.

- ❖ Create an Aquatic Health Advisory Committee within the Ohio Department of Agriculture.
- ❖ Develop a Best Management Practices program to facilitate adoption of best practicable technology currently available for water outflows.
- ❖ To assist Ohio Division of Wildlife, EPA, and the Ohio Department of Agriculture in achieving their mission of protecting natural resources in a manner that permits farmers to develop aquaculture as an important segment of agriculture.

SOUTH CAROLINA

In recognition of the importance of aquaculture to the state and to foster growth of the industry, the South Carolina State Legislature created the South Carolina Joint Legislative Committee to Aquaculture. The Joint Committee is responsible for coordinating and planning all public aquaculture and mariculture development and research in South Carolina. The Joint Committee is also required to establish an Interagency Advisory Staff to assist in the development of plans and programs related to aquaculture development. The Joint Committee was established and charged to:

1. Develop state policies and initiate legislative programs for aquaculture development in South Carolina.
2. Promote a general understanding of aquaculture among public agencies and the public sector.
3. Have staff prepare and periodically update a state aquaculture development plan which shall include an assessment of resources, opportunities and constraints. The plan shall specifically foster interagency and institutional cooperation in the development of aquaculture.
4. Request staff review of proposals for aquaculture research in South Carolina to prevent duplication of effort.
5. Plan and encourage research and development programs aimed at developing new aquaculture and aquaculture related industries.

Recommendations were made to address the leasing of submerged lands by the state for aquaculture development to ensure proper management and use of the resource. These included:

- ✓ The S.C. State Legislature should reaffirm its support of aquaculture development in South Carolina.
- ✓ The S.C. State Legislature should establish, through legislation, a state-wide aquaculture leasing program. Subsequently, all language referring to 'culture', 'shellfish culture', and 'mariculture' should be removed from existing statutes.
- ✓ The S.C. State Legislature, through the state-wide aquaculture leasing program, should assign primary responsibility for making submerged lands and waters available for aquaculture development. A conference of relevant state agencies should be convened to identify this primary responsibility.

- ✓ The Primary Agency should be given the authority to issue leases of submerged bottom and/or the water column for shellfish, finfish, and plant aquaculture. The leases should convey a necessary degree of exclusivity to minimize the risks to the aqua culturist caused by pollution, vandalism, theft, and other forms of encroachment, while protecting common law rights of the public.
- ✓ The Primary Agency should, in consultation with academic and industrial parties, establish appropriate standards for the terms of aquaculture leases, including size and duration, and criteria for performance that outline production, use and resource protection within the lease, including the execution of performance bonds as a guarantee.
- ✓ The Primary Agency should consider the adoption of other aquaculture lease specifications, including fees, royalty payments, assign ability and termination of lease agreements, also in consultation with academic and industrial parties.

The number and types of permits needed for aquaculture will depend to a large degree on the species to be cultured, the technology to be used and the size and location of the operation. The process by which an aquafarmer identifies what permits are needed and then obtains them can be very time-consuming and, in South Carolina, may take from 2 months to 3 years to complete. This is due in large part to the fact that few laws or regulations are designed specifically to promote or protect aquaculture. Many existing land-use restrictions and environmental regulations reduce economic incentives to aquaculture by creating uncertain delays in permit processing. Recommendations on actions to expedite this process included:

- ✓ The S.C. State Legislature should exempt aquaculture operations from traditional fisheries laws and regulations where appropriate, consolidate pertinent existing legislation regarding aquaculture, and develop legislation to fill in any gaps so as to balance the needs of the aquaculture with those of other aquatic users.
- ✓ The S.C. State Legislature should develop a mechanism by which an applicant need only apply at a central location for all permits, licenses, etc., i.e. "one-stop permitting".

CONNECTICUT
Public Act No. 99-93
Approved June 3, 1999

An Act Concerning Aquaculture Licensing and Regulations.

Section 1. (new) (a) The Department of Agriculture shall have exclusive authority for granting or denying aquaculture permits, except for matters specifically concerning water discharges from such aquaculture operations into the waters of the state, which shall require approval by the Department of Environmental Protection as provided in section 22a-430 of the general statutes. The department shall not consider discharges from aquaculture operations to be industrial discharges and shall treat and administer

applications and permits from aquaculture operations as separate and distinct from permits for industrial discharges for the purposes of section 22a-430 of the general statutes. Within ninety days of receipt of a sufficient application for a discharge permit for an aquaculture operation under section 22a-430 of the general statutes, the Commissioner of Environmental Protection, or a designee, shall meet with the applicant and the Commissioner of Agriculture, or a designee, to discuss such application.

(b) Aquaculture operations that withdraw less than two hundred fifty thousand gallons per day of water, where such water is not approved for human consumption, and where water so withdrawn is returned to the same source from which it was withdrawn, shall be deemed not to be a diversion as defined in section 22a-367 of the general statutes and shall be exempt from the water diversion permitting requirements of chapter 446i of the general statutes.

(c) Individual structures used for aquaculture as defined in section 22-11c of the general statues, including, but not limited to, racks, cages or bags, as well as buoys marking such structures, which do not otherwise require a permit under federal Army Corps of Engineers regulations and do not interfere with navigation in designated or customary boating or shipping lanes and channels, shall be placed in leased or designated shellfish areas and be exempt from the requirements of sections 22a-359 to 22a-363f, inclusive, of the general statutes.

(d) Transport of live aquaculture products from any licensed and approved aquaculture operation or hatchery within the state, and stocking of such products in the waters of the state, where such aquaculture products are species which are indigenous to the state and are approved for stocking by the Department of Agriculture, shall be exempt from the requirements of section 26-57 of the general statues, except that any person engaging in such transport and stocking shall obtain a renewable annual transport permit which shall govern all shipments for a calendar year designated under such permit. Such permit shall be developed and administered by the Department of Environmental Protection. Aquaculture hatcheries maintained by the Department of Environmental Protection shall be exempt from the provisions of this subsection.

(e) All shellfish aquaculture operations that utilize state approved micro algal cultured feeds or which do not use any processed cultured feed, and all crustacean and molluscan bivalve growing, hatchery and holding facilities, including, but not limited o lobster pounds, which are not exempt from requirements to obtain a discharge permit under section 22a-430 of the general statutes or corresponding federal regulations, may operate under a general permit developed by the Department of Environmental Protection and shall not be required to obtain individual discharge permits under section 22a-430 of the general statutes. On or before September 15, 1999, said Department of Environmental Protection shall adopt and implement such general permit.

MASSACHUSETTS

Aquaculture Strategic Plan-Priority Recommendations

The following recommendations reinforce recommendations made by several of the Working Groups and reflect the priority actions needed to "jump start" the aquaculture industry in Massachusetts. The first six recommendations should be considered overarching, in that they address issues which are fundamental to coordinated support for aquaculture. The priority recommendations should not take away from the importance of the recommendations found in the individual chapters. In many cases, the implementation of the specific recommendations dealing with regulatory reform, economic development and environmental review hinge on the prior implementation of the recommendations presented below. Recommendation numbers 7 - 13 address the administrative requirements necessary to support an aquaculture industry at the state level.

Note: A ($) next to a recommendation indicates that a new appropriation is necessary to implement the recommendation. If no ($) is noted, it can be assumed that the recommendation can be implemented utilizing existing staff and resources.

1. Recommendation:
Regulatory streamlining recommendations found in Chapter 2 should be implemented immediately. Standardized aquaculture applications which include detailed information needs and standard plan requirements should be coordinated as soon as possible. Regulatory streamlining and coordinated processing are central to the development of aquaculture. Each general type of aquaculture should require only one coordinated application.

2. Recommendation: ($)
In recognition of the multiple benefits of public aquaculture, the Municipal Shellfish Propagation program should be reactivated and improved. Funds should be appropriated to DMF to fund this popular program. Guidance to municipalities must ensure that propagation funds are used effectively and for appropriate purposes. Consideration should be given to incorporating the restoration of contaminated areas into this program. It is recommended that this program be administered as a matching grant program whereby the state would match town propagation budgets.
Justification: This program had significant local support and is seen as a means for developing local support for aquaculture, both private and public. By enhancing and managing productive public shellfish beds, the recreational and commercial shellfish harvesters may not be so opposed to some privatization. Other advantages of public aquaculture include the fostering of the public's understanding of aquaculture and the creation of opportunities for experimentation in propagation and harvesting techniques. Additional incentives for the towns to support aquaculture can be created by allowing them to use the proceeds of increased aquaculture license fees to increase the size of state match.

3. Recommendation: ($)
Aquaculture staff within state and municipal government is critical to the growth of aquaculture in Massachusetts. Presently, there is virtually no full time staff in State government responsible for any aspect of aquaculture regulation or economic development. At minimum, an Aquaculture Coordinator at DFA and an Aquaculture Specialist within DFWELE are necessary to meet existing and backlogged needs. The Aquaculture Coordinator would oversee the ACT, establish and maintain links with the regional, national and international aquaculture communities and would be responsible for implementation of the Strategic Plan. Most importantly, the Coordinator will serve as the single point of contact within the State for all existing and prospective aquaculturists. The Coordinator will actively assist all aquaculturists in identifying and complying with appropriate regulatory requirements. The Aquaculture Specialist within DFWELE is necessary to coordinate the streamlining of the regulatory review process as well as carry out required field survey and monitoring responsibilities.

4. Recommendation:
Any State bond monies appropriated for aquaculture purposes should be directed toward priorities identified in this Strategy. Specifically, funding for aquaculture related projects is included in the proposed Open Space Bond Bill (HB no. 5143), Seaport Bond Bill (HB no. 5127) and the Coastal Assessment Bill (SB no. 1834). Aquaculture should be included in the section of the Open Space Bond Bill known as "Linked Investment for Agriculture" which would allow state funds to be invested at lower than market rates in selected financial institutions. The savings to the financial institution could then be passed on the loan recipient.

5. Recommendation:
A priority of the aquaculture industry is to improve Shellfish Licensing terms to provide for more predictability and stability of licensing in an effort to improve financing potential. The existing licensing process varies significantly from town to town and leaves room for much discretion. It is recommended that a series of meetings be organized with shellfish aquaculturists, municipal licensing bodies (selectmen), shellfish constables and DMF to discuss potential changes to DMF regulations as well as municipal license administration.

6. Recommendation: ($)
The state should produce a user friendly "Aquaculture Regulatory Handbook" which is easily updated. This Handbook should detail the permit requirements, review time frames, jurisdictional authorities, application fees, agency contact person, necessary application materials, and review processes for the different types of aquaculture. This handbook should be geared toward prospective aquaculturists, the finance community, and other interested parties. A related longer term recommendation is to provide this regulatory handbook in CD-Rom format.

Agency Responsibilities:

7. Recommendation:
An Aquaculture Coordination Team (ACT) comprised of (existing) State agency staff with expertise and responsibility for technical assistance, environmental monitoring, economic development and permitting should be established. ACT will be responsible for policy development, industry support, oversight of regulatory streamlining, and implementation of the Strategic Plan. An Aquaculture Coordinator, located at DFA should be hired to coordinate the work of ACT. The Strategic Planning process has highlighted the need for sustained inter-agency coordination and ACT would serve that purpose. An Aquaculture Advisory Group would advise ACT.

8. Recommendation:
An Aquaculture Advisory Group which includes representation from a broad spectrum of interests including industry, conservation groups, the financial sector, landowners, municipal representatives, and academia should be established. The Aquaculture Advisory Group would advise and guide the ACT on issues of concern. The Aquaculture Coordinator would be the liaison between ACT and the Advisory Group. This group could also establish research grant criteria and review procedures for state aquaculture research and development grant programs.

Justification:
State aquaculture development and management activities should be coordinated with members of the various sectors involved to assure that policy decisions and appropriations are efficiently carried out and relevant to industry development.

9. Recommendation: ($)
A position should be established at DFA for an Aquaculture Coordinator. The Aquaculture Coordinator should be responsible for coordination of all state aquaculture activities, would oversee the work of the Aquaculture Coordination Team (ACT) and be responsible for the implementation of the Strategic Plan.

10. Recommendation:
DMF should be the lead regulatory agency for marine aquaculture and hatcheries. DMF should be responsible for developing and administering a "one-stop" permit process which incorporates the concerns and timely review of all other relevant agencies, both state and federal.

11. Recommendation:
DFW should be the lead regulatory agency for inland aquaculture and hatcheries. DFW should be responsible for developing and administering a "one-stop" permit process which incorporates the concerns and timely review of all other relevant agencies, both state and federal.

12. Recommendation:
DFA shall be the lead agency for the promotion and marketing of aquacultured products. To the extent possible, all existing DFA promotion and marketing programs should be extended to include aquaculture.

13. Recommendation:
Establish an Interagency Aquaculture Permit Review Group. This group would meet as needed to discuss aquaculture proposals presently under state review. In an ongoing attempt to streamline the regulatory framework for aquaculture, this Review Group would have representation from federal and state agencies. The coordination of this group would be the responsibility of the Permitting representative who sits on the ACT.

Justification:
The value of interagency coordination has become apparent through the Strategic Planning process. Aquaculture, by the nature of the science and industry, does not fit squarely within any existing agency in the state. Not desiring to add another bureaucratic agency, it is recommended that the Interagency Aquaculture Permit Review Group meet on an as needed basis.

PENNSYLVANIA

Pennsylvania Aquaculture Development Law - 1998

The purposes of this chapter are as follows:

(1) To encourage aquacultural operators to make a long-term commitment to aquaculture by offering them the same protections afforded other agricultural practices.

(2) To reduce the amount of governmental agencies with jurisdiction over aquaculture by transferring authority over commercial aquacultural operations to the Department of Agriculture.

(3) To encourage further development of the aquacultural industry by including aquaculture in any and all promotional and other economic developmental programs which are made available to other industry sectors.

Aquaculture is hereby designated as A NORMAL FARMING OPERATION within this Commonwealth for all purposes. This designation shall be recognized by all agencies of State and local government.

§ 4212. Wetlands.

Aquacultural facilities licensed pursuant to this chapter are not wetlands under 25 Pa. Code Ch. 105 Subch. A (relating to general provisions) so long as such facilities were created and have been continuously operating for any purpose, including effluent mitigation, prior to September 23, 1985. Facilities created on or after September 23, 1985, are not wetlands under any statute or regulation of this Commonwealth so long as the facilities are or were not created nor are currently maintained on wetlands. Normal maintenance and improvements on facilities created prior to September 23, 1985, are permissible notwithstanding any statutory provision relating to wetlands. Permits issued by the Commonwealth for normal

maintenance and improvements of facilities created prior to September 23, 1985, are not required.

§ 4213. Requirements for discharge of water.

(a) General permit.--Except as provided in subsection (b), aquacultural facilities, including those existing facilities which discharge into high quality or exceptional value waters, licensed under this chapter may be eligible for inclusion under a National Pollutant Discharge Elimination System (NPDES) general permit issued pursuant to regulations of the Department of Environmental Protection.

(b) Permitting system.--The Department of Environmental Protection is directed to develop an NPDES general permit for aquacultural facilities. Net effluent limitation, monitoring type and frequency of pollutants shall be determined in consultation with the Department of Agriculture and the advisory committee. The fee for an applicant seeking coverage to discharge pursuant to the terms and conditions of the general permit shall not exceed $100 per facility during a period of five years.

(c) Consolidation of permitting.--All agencies of the Commonwealth are directed to work with the Department of Environmental Protection to develop a consolidated permitting process for aquacultural facilities. This consolidated permitting process shall result in one permit to replace potentially several permits necessary for an applicant to file. This consolidated permitting process shall be developed and implemented on or before January 1, 1999 2000.

§ 4220. Registration for artificial propagation.

(a) Application.--Application to register for artificial propagation shall be made on forms, prepared by the department, which relate to the size, character and purpose of the facility to be used for propagation. The species of fish to be propagated and each separate propagation facility as well as any other information required by the department shall also be indicated on the forms.

(b) Registration AND FEES.--The department may register applicants for artificial propagation upon receipt of a written application signed by the applicant after the applicant has paid a fee of $150 to the department. Registration allows the registered operator to propagate all approved species of fish. The department shall establish a system to provide unique identification to a facility for the duration of that facility's continuous, commercial existence. A registration expires SHALL EXPIRE five years after the initial date of registration. A registration may be renewed for an additional five-year period upon payment of the fee.

NORTH CAROLINA

Article 63. Aquaculture Development Act.-1997

§ 106-761. Aquaculture facility registration and licensing.

(a) Authority. The North Carolina Department of Agriculture and Consumer Services shall regulate the production and sale of commercially raised freshwater fish and freshwater crustacean species. The Board of Agriculture shall promulgate rules for the registration of facilities for the production and sale of freshwater aqua culturally raised

species. The Board may prescribe standards under which commercially reared fish may be transported, possessed, bought, and sold. The Department and Board of Agriculture authority shall be limited to commercially reared fish and shall not include authority over the wild fishery resource which is managed under the authority of the North Carolina Wildlife Resources Commission. The authority granted herein to regulate facilities licensed pursuant to this section does not authorize the Department of Agriculture or the Board of Agriculture to promulgate rules that (i) are inconsistent with rules adopted by any other State agency; or (ii) exempt such facilities from the rules adopted by any other State agency.

(b) Species subject to this section. The following species are exempt from special restrictions on introduction of exotic species promulgated by the Wildlife Resources Commission except to prevent disease. All other species are prohibited from propagation and production unless the applicant for the permit first obtains written permission from the Wildlife Resources Commission.

1. Bluegill
2. Redear Sunfish
3. Redbreast Sunfish
4. Green Sunfish
5. Any hybrids using above species of the genus
6. Black Crappie
7. White Crappie
8. Largemouth Bass
9. Smallmouth Bass
10. White Catfish
11. Channel Catfish
12. Golden Shiner
13. Fathead Minnow
14. Goldfish
15. Rainbow Trout
16. Brown Trout
17. Brook Trout
18. Common Carp
19. Crayfish

(c) Exceptions for Species Not Listed. -- The following fish species that are not listed in subsection (b) of this section may be produced and sold as if they were listed in that subsection with the following restrictions:

(1) Hybrid striped bass – Production, propagation, and holding facilities in the Neuse, Roanoke, or Tar/Pamlico River basins for the hybrid striped bass shall comply with additional escapement prevention measures prescribed by the Wildlife Resources Commission.

(2) Yellow perch. – A letter of approval from the Wildlife Resources Commission is required before the yellow perch, perca flavenscens, may be raised at a facility located west of Interstate Highway 77.

(d) Aquaculture Propagation and Production Facility License. The Board of Agriculture may, by rule, authorize and license the operation of fish hatcheries and production facilities for species of fish listed in subsection (b) of this section. The Board may prescribe standards of operation, qualifications of operators, and the conditions under which fish may be commercially reared, transported, possessed, bought, and sold. Aquaculture Propagation and Production Licenses issued by the Department shall be valid for a period of five years.

§ 106-764. Violation.

A person who violates this act or a rule of the Board of Agriculture adopted hereunder is guilty of a Class 3 misdemeanor. (1993, c. 18, s. 2; 1994, Ex. Sess., c. 14, s. 56.)

APPENDIX X

Impacts of Regulations on the Economic Development of Aquaculture in Other States

for Jill Stevenson, Department of Natural Resources
October 2003

Aquaculture coordinators from states with similar resources to Maryland were contacted to collect findings of other workgroups engaged in the study of the impacts on the economic development of the aquaculture industry. Three responses were received. One was a survey conducted by the East Coast Shellfish Growers Association in 2002 titled "Issues Affecting East Coast Shellfish Aquaculturists." Other responses included a white paper and Strategic Plan from the Massachusetts Office of Coastal Zone Management (dated September 1995), and an Aquaculture Development Plan from the Georgia Aquaculture Development Commission (dated February 1996). The web addresses for these three are as follows:

http://www.state.ma.us/czm/sptoc.htm
http://www.state.ma.us/czm/wptoc.htm
http://www.forestry.uga.edu/warnell/service/library/adp/index.html

East Coast Shellfish Growers Survey

The East Coast Shellfish Growers surveyed industry and non-industry (researchers, local and State shellfish managers, and extension agents) members on general topics, not necessarily related to economic development. Only four non-industry responses were identified as having significantly more weight: 1) enable aquaculture development in coastal areas as a replacement for wild fisheries; 2) stop conflict-of-use issues between natural resource conservation and production (SAV); establish an Aquaculture Experiment Station for shellfish farming; and 4) reduce user conflicts.

Industry responses with relevance to aquaculture economic development included: promote aquaculture expansion; develop Best Management Practices; adopt generic marketing; standardized, reasonable and logical guidelines for shipping seed between states; direct the research community to focus on issues which would support industry production and position; improve material handling to expand operations; and poacher protection.

Several issue categories were also listed, including research and socio/political issues. Under Governmental Affairs, there were responses which suggested coast wide parity of governmental regulations, improved education of aquaculture practices and benefits, streamline agency jurisdiction over aquaculture, develop aquaculture zoning, and right to farm. Responses under Business Aspects included access to venture capital and funding, business management education, cooperative purchasing or selling, industry organization, and product marketing.

Massachusetts Aquaculture White Paper and Strategic Plan

The effort in Massachusetts was to develop a White Paper on the current status of the industry and make recommendations to improve the climate for aquaculture. Much of the White Paper covered the existing legal and economic framework existing in the State and expanded on the issues that were represented. The issues were divided into Inland and Marine Aquaculture.

The White Paper made three recommendations for inland aquaculture: 1) develop a user-friendly brochure on aquaculture permits since developing a "one-stop shop" for permits was unlikely due to differing state authorities and mandates; 2) establish an aquaculture extension position; and 3) coordinate private, state and federal efforts to fund research in new animal drugs for treating fish. Suggestions for marine aquaculture listed: 1) remediate and reopen closed shellfish waters, which limit both aquaculture and fishery economic opportunity; 2) improve the environmental review of projects by funding State efforts involved in the regulatory and technical assistance branches.

Under economic review, there was difficulty in reaching conclusions since "The lack of an accurate reporting mechanism for marine aquaculture production has resulted in unreliable economic information on this small, but growing industry. Aquaculturists are oftentimes not viewed as business people but rather "hobbyists" due to inconsistent reporting of profit and poor record-keeping. This perception that aquaculture is a hobby and not a viable business has led to difficulties in obtaining technical assistance, bank loans, small business assistance, etc." Also mentioned was consumer concern about the safety of shellfish, a need for promotion of marketing, small business development and financing by state government, privatization of some traditional government functions in resource restoration and depuration, increased State and federal technical research and development, and improved training and educational opportunities within the field. The paper also suggested a gubernatorial policy which supports aquaculture in the state, and recommended considering changing the regulatory structure to differentiate between commercial aquaculture, resource preservation, enhancement of natural fisheries, and experimental endeavors.

The Strategic Plan has 68 specific recommendations, with six priority issues: 1) regulatory streamlining, 2) establish an interagency Aquaculture Coordination Team, 3) establish an Aquaculture Coordinator position, 4) establish an Aquaculture Advisory Group to advise the Coordination Team, 5) direct all related bond appropriations toward priorities of the Strategic Plan, and 6) improve and standardize shellfish licenses to improve the prospects for obtaining financing for aquaculture ventures.

Georgia Aquaculture Development Plan

The Georgia Aquaculture Plan includes an extensive examination of the current species, growing methods, fisheries and natural resources of the State. Action items were summarized generally. The listed items included four topics for economic stability: 1) educating lenders, investors and financial regulators about the industry; 2) getting lenders

of overline portions of large loans to employ specialists as loan reviewers (for both old and new loans); 3) fill the need for qualified appraisers; and 4) improve insurance programs in case of disasters.

The plan also recommended a quality-assurance plan sourcing from the aquaculture industry to meet consumer concerns; directed their Department of Natural Resources to develop a set of guidelines for the use of exotic species or genetically-altered animals in aquaculture production, and to act in greater support of marketing and industry development; directed their Department of Industry and Trade to recruit aquaculture businesses to relocate in Georgia; and expand the staff, programs and resources of the Cooperative Extension Service's Aquaculture and Fisheries program, the Southern Appalachian Fisheries Research and Extension Center, and the Coastal Plain Experiment Station. The Plan also recommended the establishment of a Georgia Aquaculture Commodity Commission, and, if approved by the industry, establish a feed check-off program to raise funding for promotion, market development, and research.

APPENDIX XI

Draft

Report of the Legislative, Regulatory and Permitting Workgroup
Of The Seafood and Aquaculture Task Force

Authority: House Bill 662, 2002 Legislative Session

Members:
Erin Butler, Department of Health and Mental Hygiene
Richard Eskin, Ph.D., Maryland Department of the Environment
Robert Parkinson, Representing the Shellfish Aquaculture Industry

Participants:

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And

Joshua Ferguson, House Environmental Matters Committee

Last Revision: 8/27/03

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Appendix 1: 2003 Procedure for the relaying of off-bottom cultured shellstock for the purpose of natural cleansing (draft).

Appendix 2: Off-bottom aquaculture permitting guidelines

1.0 INTRODUCTION

At its meeting on January 8, 2003, the full Task Force, chaired by Senator Klausmeier decided that a comprehensive review of the existing statutes and regulations related to seafood and aquaculture would be necessary. At that meeting it was decided that assistance would be requested from the Legislative Services Bureau.

The Legislative, Regulatory and Permitting Workgroup, chaired by Senator Astle since its first meeting on January 2, 2003 began evaluating issues that would could help guide that review as well as changes in agency procedures to facilitate the growth of the aquaculture industry in Maryland. The Law and Regulations Workgroup met subsequently on Feb. 3, March 3, to further refine and expand the list of issues that needed to be addressed and to develop recommendations to the larger Task Force.

The work group used several approaches:

- "If the only goal is to support aquaculture industry what changes would be made? What would we change?"
- A case study approach of industry-government interaction by workshop/conference including Virginia, North Carolina, Alaska, and Florida.
- Incorporation into regulation in part, of the guidance issued by the National Shellfish Sanitation Program headed by US Food and Drug Administration, and issued as a model ordinance.
- A review of existing statutory and regulatory provisions.
- Discussion and review of existing procedures used in Maryland and other States.
- Discussion and review of other legal requirements indirectly related to aquaculture such as exotic/invasive species laws and wetlands laws.

As of October, 26, 2003, the approach of the workgroup was revised. Legislative Services agreed to facilitate meetings and help focus the workgroup on what was necessary to create or revise legislation. The workgroup was also expanded to include members outside the Task Force.

The report is divided into several chapters based on issues specific to different types of aquaculture: off-bottom shellfish, on-shore finfish aquaculture, off-shore (pen) finfish aquaculture, non-finfish or shellfish aquaculture (e.g., plants), procedural issues, general regulatory treatment of the industry, e.g., in comparison to agriculture and legislative and regulatory recommendations.

1.1 State Government Roles

State government roles are briefly summarized here for context and perspective on the issues and recommendations presented below. State agency roles are addressed in more detail in Section 6.0 (Process and Procedural Issues). Virtually every State Health and Environmental Agency plays a role in Seafood and Aquaculture activities. However, there is significant federal oversight of the State programs.

The number of State agencies that play a role in this industry has been cause for concern regarding complexity and duration of the regulatory aspects of this process. The roles of each agency are rational and typically related to the roles of the federal agency oversight, and the application of similar programs (e.g., for MDE general water quality provides the same expertise necessary for classification of harvest areas) to other federal requirements.

Issue: Can the number of agencies be reduced and/or the regulatory programs relation to Seafood and Aquaculture be streamlined or simplified?

1.1.1 The Department of Mental Hygiene (DHMH) plays two roles. The DHMH Laboratories, Central and Eastern Shore Regional, conduct bacteriological analysis on all the shellfish growing water samples and shellfish meat samples submitted by MDE and DHMH. The results of these analyses determine how shellfish growing waters are classified, if oysters can be released after the relay period is completed, and if shellfish stored and processed at licensed and certified shellfish dealers meet bacteriological standards. The DHMH laboratories are evaluated by the USFDA to assure conformity with the standards set forth in the NSSP Model Ordinance. The DHMH Office of Food Protection and Consumer Health Services inspects and licenses all shellfish dealers to assure that shellfish sold or offered as food are safe for human consumption. The OFPCHS certifies the shellfish dealers who comply with the standards of the NSSP for listing in the Interstate Certified Shellfish Shippers List (ICSSL). A dealer who is not listed may not ship into interstate commerce. The USFDA evaluates this program annually for compliance.

1.1.2 The Department of the Environment (MDE) plays two key roles. The first is classification of harvesting areas. Classification (i.e., approved, conditionally approved, restricted, or prohibited) is dependent on the statistical summaries of data on pathogenic indicators (fecal coliform) collected over a representative period (approximately 30 months). The classification of the areas determines whether harvest can occur directly at any time, directly except after significant rainfall, only after cleansing for at least two weeks, or not at all. The Food and Drug Administration oversees this aspect of the shellfish program as well.

The second role, relates primarily to aquaculture. The Department, in conjunction with the U.S. Army Corps of Engineers (ACOE), issues wetlands permits and licenses, if a structure is placed in the water.

1.1.3 The Board of Public Works, issues, for a fee, a water column lease that allows the benefits of a State resource, to be held by an individual. This action is usually allowed in consultation with the ACOE and MDE.

1.1.4 The Department of Natural Resources controls fisheries related issues including legal sizes, allowable harvest, the oyster replenishment program, etc. The allowable harvest is usually determined in conjunction with the regional Atlantic Marine Fisheries Commission.

1.1.5 Maryland Department of Agriculture primarily plays a marketing, statistical, and technical advisory role for the Seafood and Aquaculture industry.

1.2 Federal Roles
Several federal agencies play a direct or indirect role in regulation the Seafood and Aquaculture industries. The roles may primarily an oversight role of State activities (e.g., the Food and Drug Administration) or more direct through a consultative decision-making process (e.g., ACOE).

1.2.1 Food and Drug Administration (FDA) plays a major role in the Seafood and Aquaculture industries, ranging from issuing consumption advisories for marine fish contaminated with mercury and the implementation of harvest water classification. For the shellfish industry FDA, in conjunction with the States has developed a Model Ordinance for the National Shellfish Sanitation Program (NSSP) used by the State shellfish programs. This document provides guidelines on the technical aspects of the program including acceptable indicator values, inspection and certification standards for shellfish dealers, enforcement, and tracking that will permit removal of contaminated product from the market.

FDA audits various aspects of the State programs each year. Its enforcement authority derives primarily by its ability to unlicensed the sale of seafood products across state lines.

1.2.2 US Army Corps of Engineers (ACOE) works with MDE to issue federal/state wetlands permits or licenses.

1.2.3 National Marine Fisheries Service of the National Oceanic and Atmospheric Administration and Regional Fisheries Commissions.

1.3 Tensions between Government and Industry

1.4 Tensions between Watermen and Aquaculture

2.0 OFF-BOTTOM SHELLFISH AQUACULTURE

ACTION: Incorporate NSSP in regulations (in progress at DHMH).
ACTION: Explore relevant MDA statutes and regs.

2.1 Relay

Relay is the transfer of oysters from areas not suitable for harvest to areas certified for harvest, where the oysters can cleanse themselves in clean water and then be harvested. Opportunities for relay allow additional areas to be used to grow oysters from seed to market size, facilitating both continuous supply and larger volume trade. The key issues generally come under the NSSP guidance in that chain of custody must be verified as to original growing area, assurance that all oysters removed from the initial site are moved

to the relay site, and tracking duration at the relay site. All of these requirements are to assure, by documented chain of custody, that no oysters enter commercial trade unless all relay requirements are met. Also, relay always limited to the in time when water temperatures are greater than or equal to 50°F (NSSP requirement) and during the season closed to oyster harvest, usually April to October (required byDNR statute).

Existing relay procedures are in place for natural or leased bottom harvest and require the Natural Resources Police (NRP) to be present when the oysters are harvested at the initial site, and accompany the transfer by boat to the relay site, which is then flagged, and from which harvesting cannot occur for the specified time. These procedures do not work for the off-bottom industry because transfer does not occur by boat, the NRP do not have the resources for additional relay activities, and there is no way to monitoring the harvesting of bags of oysters from docks or piers.

Recommendation: Need to set up a relay program suitable for the off-bottom aquaculture industry.

Issues to be resolved:

- What will the cost be?
- Who will bear the costs?
- Who will be responsible?
- Need to explore the development of fees to fund the effort.
- Reserve NRP may provide a possible work force.
- Restriction on movement or harvesting doesn't make sense; needs to addressed. Part of relay issue?
- What is the minimum distance that relayed oysters can be set near clean oysters?

Need to consider reasons to establish prohibited areas and justification for not having one.

Currently relays are set up on a case-by-case basis by letter, approved by MDE and DHMH. A routine method must be established to simplify and shorten this process. An example of the current letter is presented below.

2.2 Wetlands Use

2.2.1 For any structure to be placed in navigable waters a wetlands license or permit is necessary. For certain uses a water column lease may be needed as well. The licenses are jointly issued by MDE and the Army Corps of Engineers and prior to issuance, a review is conducted for navigation and habitat issues (e.g., submerged aquatic vegetation impact). If the license is for work in State-owned wetlands it is issued by the Maryland Board of Public Works (BPW) which must advocate for the resource held in trust for the State. If the work is in privately owned wetlands the permit is issued by MDE. Most aquaculture at this time is in State wetlands and are therefore issued by the BPW. Even after navigation and resource issues are resolved, other issues may delay permit issuance such as the need and availability for relay or esthetic issues.

Areas 100 sq. feet or less do not need a license. Areas greater than 100 sq. feet may need a public hearing before a permit or license can be issued. Bags or boxes of oysters, being artificial structures would need a wetlands license, but not a water column lease. The wetlands license gives the applicant sole use of the area.

Issues: Complex process, on top of complex regulatory scheme appears to duplicative with US Army Corps of Engineers requirements. A possible mitigation of the difficulties may be to find a better way to incorporate comments to facilitate ability of applicant to check progress of application. Involved agencies include: US EPA, US National Marine Fisheries Service, Department of Natural Resources, Maryland Historical Trust, and US Fish and Wildlife Service.

Issue: If permanent relay procedures are not in place, should wetlands permits be authorized for areas not suitable for direct harvest?

Issue: How should risk be assessed in the presence of CCA (chromated copper arsenate) or creosote treated wood on wooden structures such as piers?

Current guidelines from the Board of Public Works are summarized in Appendix 2.
Issue: Should a sliding scale for fees be implemented? (See Figure 1).

Should off-bottom aquaculture be treated more like leased bottom than like a permitted operation.

2.2.2 Water column lease.

Water column aquaculture is limited to 5 acres for an individual or 10 acres for a project with two or more individuals.

2.3 Nursery products

Size is a critical issue, defining what can be marketed and therefore also what can be moved under relay without concern that it will be sold commercially.

There are currently restrictions on the sale of seed oysters. Seed oysters cannot be sold commercially until very high thresholds are met for the replenishment program. This results in very low seed count on the available substrate. Should sale of seed stock be market-based?

There are also restrictions on where spat can be captured.

Recommendation: Establish operational definitions for market and/or nursery stock sizes.

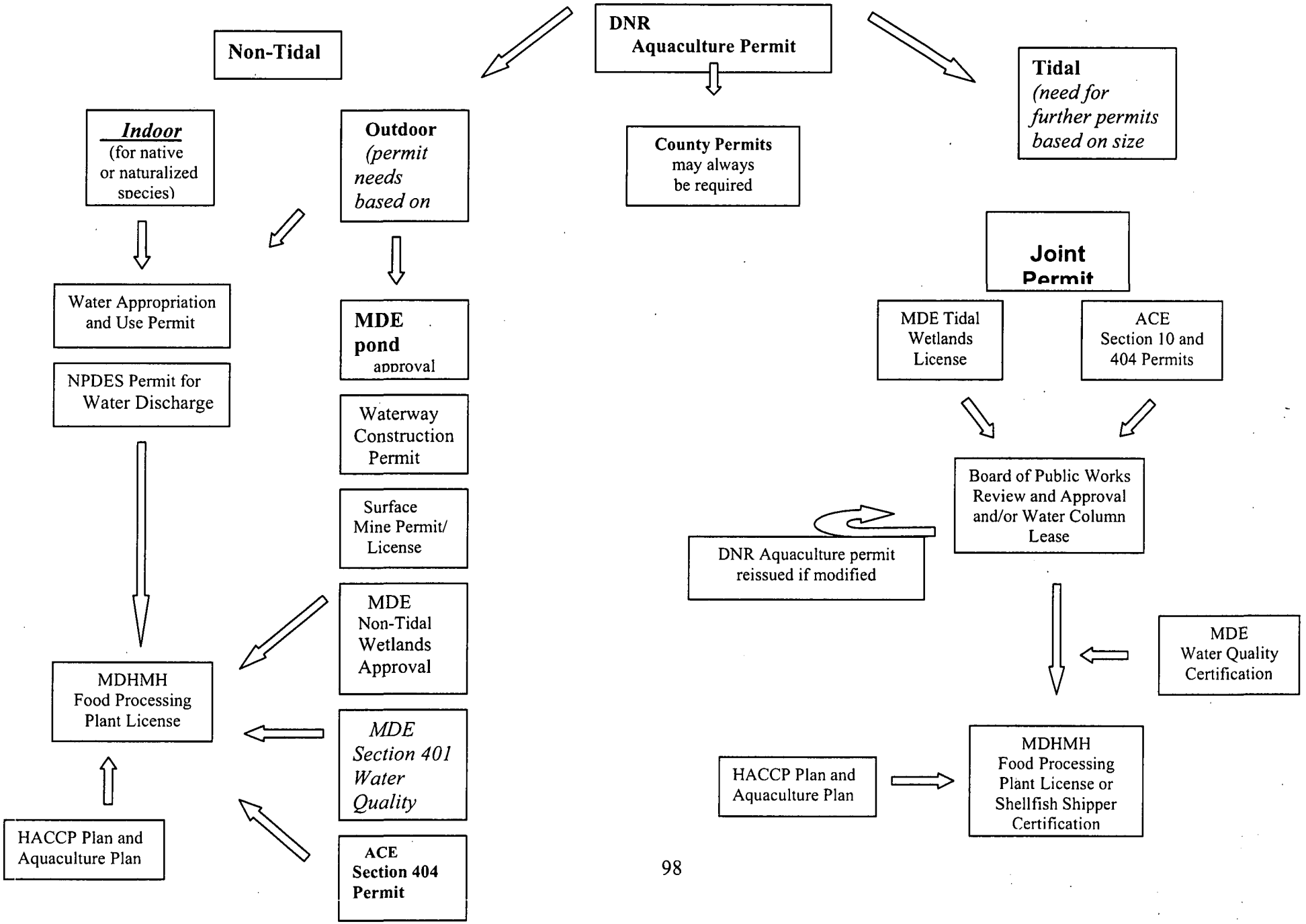
2.3.1 Definition of nursery product

An operational definition of how size is measured may be necessary to prevent nursery stock from reaching market. This issue may be diminished if there is a relay process in place. If small oysters can be moved as nursery stock it may relieve the need for a formal relay, saving costs for the State and the growers. This is also, in part, also a patrol issue for NRP.

2.3.2 Harvest size standard

Issue: What basis will be used for determining harvest size standard.
6 months from grow out. Size limitation (cull or market size)?
Issue: Should harvest size standard be different for aquaculture vs bottom harvest, e.g., tonging vs bag culture.
Issue: Can bagging and tagging with tamper-proof tags relieve the enforcement issue of having market sized oysters out of the water. Also the tamper-proof seal we have been using do not hold up over long storage times in the water. Stronger seals are available, at a cost, but have not been evaluated for durability under these conditions.
Issue: Without a known growth rate the 6 months remains difficult to determine. This is compounded when the harvest or market size is lowered for aquacultured product. One recommendation is to lower the market size to 2 inches, or not have a market size at all, and require that all shellfish grown in restricted waters be relayed.

Figure 1: Aquaculture Permit Track



2.4 Type of shellfish

Are there differences between clams and oysters in terms of public health or harvesting that need to be recognized in regulation, either for natural bottom harvest or aquaculture?

2.1 Harvest of edible shellfish for bait

Certain types of edible shellfish such as razor clams and Corbicula can also be used as bait. Because they are edible, harvesting is prohibited in restricted areas. Regulations are being considered that incorporate dyeing to prevent sale for human consumption and allow harvesting for bait.

2.5 Rainfall measurement

Obtaining the status of Conditional waters (open or closed to harvest) by calling the MDE is a critical control point (CCP) in the HACCP plan of the aquaculturist/ dealer we license. This cannot be self-monitored, since the shellfish authority determines open or closed status. A harvester may exceed MDE's closures by self-monitoring but may not be the approving authority, i.e., may not set a more relaxed standard.

Rainfall is a critical issue for areas that are classified as "conditional." These areas are open to harvest except for 3 days after a rainfall of 1 inch or more.

Are the rainfall gauges used by MDE to monitor rainfall for conditional areas sufficiently representative of key areas or are there too few gauges, too far from the harvesting areas, or representing too large an area? Can the industry provide rainfall monitors audited by the State.

2.6 Use of bacterial indicators

Recommendation: Consider a letter from the General Assembly to the US FDA asking them to determine whether enterococci, advocated by US EPA has being better correlated with disease risk should be used for the shellfish program as well.

In 1986, US EPA issued guidance on the use of enterococci as the appropriate indicator for evaluating the safety of swimmers in recreational waters. US FDA has retained fecal coliform as the appropriate indicator of water quality for shellfish harvesting purposes. This perceived discrepancy is of concern.

Issue: Shellfish meats that have been relayed (moved from areas where direct harvest is not approved) are tested before harvest, although this is not required for shellfish grown only in approved waters. There is some thought that meats should also be tested before moving to cleansing areas, even though this would not negate the need to test the meats before final harvest.

Issue: Testing before relay is being requested to challenge the need for relay and the use of water quality as a standard for classifying shellfish waters.

2.7 Sampling requirements

2.7.1 Can methods, processes or procedures be developed to identify areas no longer harvested and reduce sampling at those areas to reallocate effort to more productive areas?

2.7.2 Should areas to be opened to shellfish grow out receive priority allocation of monitoring resources?

2.7.3 The monitoring procedures should be clarified, and classes or categories of workers other than State employees who can conduct monitoring should be identified.

2.7.3.1 Labor category requirements
The Maryland Department of Labor has codified the requirements for Apprentice and Journeyman labor categories and is working toward Master shellfish grower. (Get citation).

Recommendations: the State agencies and industry should build on these requirements to establish training and certification requirements that would allow the private sector to meet the NSSP requirements.

2.7.4 Maryland law calls for sampling frequency at restricted areas beyond what is possible with current resources.

Recommendation: Not testing as required should be corrected by providing adequate resources which must include MDE staff and equipment plus laboratory support for additional sample analyses

2.7.5 Procedures should be developed to allow the industry to conduct sampling and/or relay with audit and enforcement by the State.

Recommendation: Procedures should be developed to allow the industry to conduct sampling and/or relay with audit and enforcement by the State.

2.8 Health concerns with consuming shellfish from unmonitored areas

It has been a traditional opportunity for those with water front property to harvest shellfish for their personal consumption. In several counties there are exclusive rights to the water surrounding piers to enable landowners to place shellfish in the water without concern that they will be "harvested." When Maryland was less populated and there were fewer sources of bacterial contamination (e.g., septics, pet waste) there was minimal potential risk from consuming shellfish from unmonitored areas. Although sewage treatment has made huge advances, and there are few if any remaining direct discharges, with the increased development and aging of waste infrastructure such as transportation pipes and septic systems, MDE has long warned of the risk of eating shellfish without

knowledge that the water quality is adequate to minimize the risk. Some of those risks are related below.

The growing proliferation of home based aquaculture projects and oyster gardens has lured some to eat the shellfish grown for water quality improvement initiatives. Due to the potential presence of pathogens, officials at the Maryland Department of the Environment (MDE) urge oyster growers against doing so. Nonprofit organizations encouraging oyster gardening as an environmental benefit have disseminated these concerns. For profit organizations have not.

Shellfish are filter-feeding organisms; they strain the surrounding water through their gills which trap and transfer food particles to their digestive tract. If the water they are housed in is contaminated with disease-causing organisms, these organisms are also trapped and consumed as food. Because shellfish pump large quantities of water through their gills each day, even low concentrations of harmful organisms from the waters can reach dangerous levels in the shellfish. If shellfish containing these organisms are eaten raw or partially cooked which is the standard practice, illness may result.

Shellfish are bivalve mollusks such as clams, oysters, and mussels. [The term shellfish does not include crabs, lobsters, or shrimp.] Therefore, to protect public health, it is mandatory that shellfish be harvested from approved shellfish waters where protective standards have been met. MDE protects and classifies the state's shellfish harvesting waters.

To protect public health, MDE does not permit the harvest of shellfish from marinas because of the potential for illegally discharged or unintentional discharge of boat waste. This restriction does not include blue crabs, which are crustaceans and do not filter-feed like oysters. MDE further recommends against consuming oysters grown from private piers. The area around a private dock or pier is near the shoreline in quiet waters, rather than out in the river where the oyster's natural habitat is typically found. Activities such as the unexpected failure of a neighbor's septic system, drainage of water from yards where pets are kept and other factors can introduce disease-causing organisms, which can be concentrated by oysters, posing a risk to people eating them.

In Maryland, the responsibility for the sanitary control of the shellfish industry is split among three state agencies: MDE, the Department of Health and Mental Hygiene (DHMH), and the Department of Natural Resources (DNR). MDE is responsible for identifying and eliminating pollution sources affecting Maryland's shellfish harvesting waters, as well as determining whether the shellfish harvested are safe for human consumption. DHMH is responsible for any food control measures necessary to ensure that shellfish are harvested, processed, packaged and transported under sanitary conditions. DHMH also regulates shellfish dealers to assure compliance with the required sanitary standards. DNR is responsible for posting areas restricted to shellfish harvesting and for patrolling these areas to prevent illegal harvesting.

Diseases associated with shellfish consumption

There are a number of diseases that are caused by the transfer of fecal bacteria or viruses from human sanitation sources to raw shellfish. While these diseases do not infect the shellfish, oysters and clams may filter the disease-causing organisms out of the water and can accumulate enough of them to make consumers of raw or partially cooked shellfish ill.

Norwalk and Norwalk-like virus – The main reservoir for this virus is man. Symptoms include nausea, vomiting, diarrhea, abdominal cramps, and fever. The disease is usually self-limiting.

Hepatitis A virus – This virus causes weakness, fever, abdominal pain and yellow jaundice. It may result in damage to the liver. Although death is rare, it may occur among those with underlying diseases.

Salmonella – Several species of Salmonella are naturally found in the intestines of mammals, birds, amphibians, and reptiles. Salmonella can be transferred to shellfish by sewage pollution of coastal waters. Salmonella infections cause nausea, vomiting, abdominal cramps, and fever. One species causes typhoid fever.

Shigella –This bacterium causes symptoms very similar to Salmonella. Shigella is found only in the human intestinal tract and is not a result of contamination by animal species.

Escherichia coli – Also known as E. coli, this bacterium is one of the fecal coliforms. Most types of E. coli are essential inhabitants of the human intestinal tract and are needed for proper digestion and processing of foods. Pathogenic forms can cause abdominal cramps, diarrhea, fever, nausea and vomiting. Death may occur among the very young, the elderly, or immuno-compromised individuals.

Campylobacter jejuni – This bacterium is widely distributed in the intestinal tract of poultry, livestock, and warm-blooded domestic animals. In humans, it causes diarrhea, abdominal pain, headache, weakness, and fever.

Potential risk to some individuals

Consumption of raw or partially cooked oysters creates a risk of illness to certain individuals with predisposed medical conditions. People at "high risk" include those who have liver disease, excessive alcohol intake, diabetes, AIDS or HIV infection, stomach disorders, inflammatory bowel disease, cancer, abnormal iron metabolism, steroid dependency or any illness or medical treatment which results in a compromised immune system. Older adults are more likely to have these health conditions and should be aware of their health status. Anyone at high risk needs to be especially careful to avoid eating raw shellfish.

In addition to diseases associated with pollution sources, different kinds of Vibrio bacteria are found naturally in coastal waters and are not a result of pollution. Vibrio

bacteria can be found in waters approved for oyster and clam harvesting. Symptoms of illness from Vibrio bacteria include vomiting, diarrhea, stomach pains, severe weakness, skin rashes, blisters, shaking chills and high fever. If you have any of these symptoms after eating raw shellfish, see your doctor for medical treatment.

Shellfish harvested from Maryland waters have never been implicated in a Vibrio illness. During the warm weather months more of the Vibrio bacteria can be found in shellfish and the risk to consumers is higher. Everyone should enjoy fresh seafood but should also be aware that eating raw molluscan shellfish can cause illness. For people with the medical conditions described above, eating raw shellfish may be a risk they need to consider and determine if they want to eat cooked shellfish instead.

Enjoy Maryland oysters from approved areas

Oysters harvested from approved waters, packed under sanitary conditions, and properly refrigerated are usually safe for raw consumption by healthy individuals. Cooking oysters to an internal temperature of 140° F or greater for 4-6 minutes destroys the common microorganisms of public health concern. The nutritional value of oysters is very good. Raw oysters have a protein content of about 9 percent and a fat content of less than 2 percent. One-half pound of raw oysters contains about 150 calories. The cholesterol content of oysters is 50 milligrams/100 grams of meat, and the sodium content is 109 milligrams/100 grams. Oysters are also very high in iron content.

Oysters can be enjoyed in a variety of cooked preparations including steamed, stewed, roasted, baked, broiled, sautéed, poached, and fried.

3.0 LEASED BOTTOM

Areas of Bay bottom, if not productive areas for natural oyster growth, may be leased by individuals for oyster production. The Department of Natural Resources authorizes the leases, and several counties have specific limitations on various aspects of leases. The process for obtaining a lease in show schematically in Figure 2. In Maryland a bottom lease application fee costs $300 to cover the survey. The lease then costs $3.50 per acre per year. The size of a bottom lease differs by area. I will need to look this up.

Issue: Does leased bottom operations fit into the aquaculture picture or should leased bottom operations be considered part of the natural fishery and fall under those regulations.

Issue: How do fees, availability, use, regulation, and process compare for leased bottom in comparison to off-bottom aquaculture? Should there be consistency between the two? There are currently many leases that aren't used. Should they be available after a certain amount of time to lessees who will make use of that resource (are leases an entitlement if they have been held for a certain amount of time?) Only two counties currently have leases available, all of the other counties are closed to leasing. Is that good or bad?

Issue: What is an equitable price for the use of State Waters?

There is a 30-acre limit on leases. No apparent limit on off-bottom aquaculture, but may be limited by wetlands process since navigation is involved with aquaculture floats, but not with leased bottom.

Issue: There are prohibitions on leasing in some counties. Could non-productive oyster bars be shifted to leases?

3.1 Access to good bottom

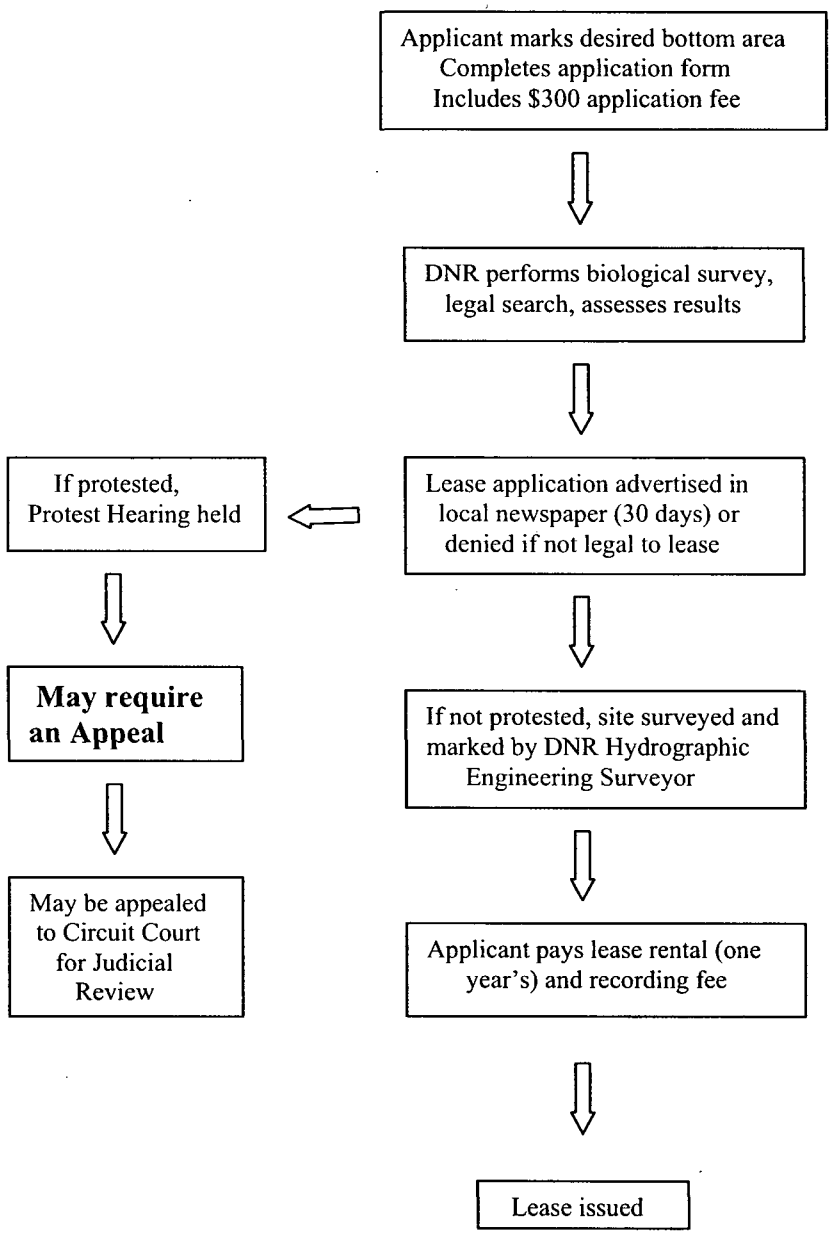
3.1.1 Leasing of Natural oyster bars

Leasing of Natural Oyster Bars (NOB), the best bottom is prohibited by law (4-11A-05(c)) which are reserved for the public fishery. Barren bottom, that lacks shell and oysters, is all that has been available for leaseholders.

Recommendation: On a limited basis some NOBs should be made available for lease for a defined time span. Leases should require performance i.e., production of shellfish. Lease costs are probably under-valued and should be evaluated with respect to the market value.

Florida charges $15.95 per acre with a $10 "cleanup" surcharge and has a maximum number of acres that can be leased by a single entity or associated entities, i.e., family members. It also has a $200 nonrefundable filing fee for lease permits. There are specific lease conditions and a paper audit of lease conditions, including seed purchases. Auditing and enforcement includes audit of seed purchases and visit to lease sites to determine that lease requirements are being followed. Letter of warning, notice of violation, are required before a final step of termination of lease.

Figure 2: OYSTER LEASING FLOW CHART



3.1.2 Prohibition on leasing in certain counties

Charles, Dorchester, Kent, Queen Anne's, Somerset and Talbot counties do not issue new leases. This limits opportunities in these areas.

Recommendation: Leases should be re-opened, and those not used within a specific time should be returned to the market.

3.2 Water Column permit process

3.2.1 Acquiring a permit is too lengthy. Many agencies are involved and if one raises a concern, significant delays can result. The process is also complex and not clear.

Recommendation: The permitting process in other states should be evaluated for application to Maryland. In the interim, a guidebook clarifying the process should be produced and be available. North Carolina provides a good example.

3.3 Seed production

3.3.1 Seed production by leaseholders (4-1004(a) and (c) Nat. Res. Article - Catching spat

Leaseholders are allowed to catch spat, but the gear for doing so cannot touch the bottom. This makes the process unnecessarily expensive, cumbersome and labor intensive; permits may be needed to deploy the gear.

Recommendation: Simplify spat collection and seed production by allowing use of bottom placed equipment. Access to natural oyster bar areas, if not the actual bars should be allowed. Containerized cultch to catch spat can be used to keep private shells separate from natural set and oysters.

3.3.2 Seed production by DNR for sale to leaseholders (Sections 4-1103(e) and 4-1103(f)(1)(i) and (f)(4))

Recommendation: Provide access to more seed from state seed program
DNR can only sell seed from the State seed program to leaseholders after 1 million bushels have been moved.

In any oyster culture situation, it is absolutely critical to have a reliable supply of high quality seed, Maryland currently has some problems that supercede the seed supply issue. The situation with seed oysters has changed over time but even in earlier times seed was not easy to obtain, and growers stopped actively farming their leases due to disease mortality. Add to this, the problems with theft from leased bottoms (which would likely be even more severe today if they had any oysters on the lease) and it's easy to understand why not many risk their funds attempting to grow baby oysters that they will likely not be able to sell. There has been much emphasis in recent years on the "new" innovative approach of off-bottom oyster culture. Let me assure you that this is far from

any new approach. All have gone out of business due to disease mortality and the high cost of growing oysters in this way.

The University of Maryland, Center for Environmental Science, Horn Point Laboratory oyster hatchery has continued to expand its efforts as they pertain to oyster seed production. During the early to mid-1990s the Horn Point facility produced around 5 million spat on shell per year. Numbers have risen each year until during 2002 approximately 80 million spat were produced. This includes a few million cultchless spat. This year Horn Point has already surpassed 125 million spat on shell and a couple million cultchless spat. Horn Point is still in full production so its final numbers will be even higher. As Horn Point transitions into a new facility over the next year, production is anticipated to significantly increase. This is due to both larger culture facilities and our ability to better care for them. A conservative estimate on the new hatchery's production is 300 to 500 million spat per year. Most of this production has and will be used in a wide range of projects. We currently support harvest bars, sanctuary bars, managed reserves, and private oyster culture projects. The Maryland Sea Grant Extension Program is also associated with this program and the Program actively conducts outreach programs many of which have been aimed at Maryland's private oyster culture fishery (personal communication, Don Merritt, Horn Point Laboratory, 2003).

Insert section on DNR Hatchery and aquaculture center at Piney Point, MD?

3.3.3 Supply of fresh shell for seed production

Controls on Shell Availability and distribution[1]

The availability and distribution of fresh shells are determined by laws, regulations, and DNR policies. The laws mandate that fresh shells must be made be made available to DNR by the processors and that DNR must undertake certain steps to acquire shells. The laws also provide leaseholders first access to fresh shells. The regulations set prices for shells, as do contracts between DNR and the planting captains. DNR polices determine how these shells, once acquired, are allocated to the various restoration projects. The needs of hatcheries and other users are addressed by DNR's policies.

Law and Regulations

The laws pertaining to fresh shells are designed to maximize the volume of shells used for oyster restoration and eliminate uses such as driveway fill or construction aggregate. Even though fresh shell supplies are a minor component of cultch supply in Maryland (dredged shells provide over 90% of the cultch), these laws recognize fresh shells as valuable oyster habitat.

Issue: Does continued dredging of old shell further destroy potential habitat?

[1] Fresh shell summary by DNR for Oyster Roundtable (March 1998)

The laws reserve shells for DNR, unless the shells are used to plant leased bottom, therefore leaseholders actually have priority over DNR. Leaseholders can purchase shells directly from the packer at anytime as long as the shells haven't already been purchased by DNR, who would then be the owner. The leaseholder and the packer must inform DNR of the purchase (number of bushels, purchaser and address, lease number, date of purchase) to document that the sale was within the law.

Natural Resources Article, sections 4-1019 to 1019.2 govern fresh shell use and sale in Maryland. Section 4-1019 requires that buyers and sellers of fresh shell report their transactions to DNR. Sections 4-1019.1 and 4-1019.2 specify a detailed program for the purchase and use of shucked shells for oyster restoration.

Section 4-1019.2(b) requires that "all shells of oysters harvested from the Chesapeake Bay or its tributaries and commercially shucked in the State" shall be reserved for purchase by DNR. The packer must hold the shells for DNR for 8 months after the opening of the oyster season, unless the shells are planted on leased bottom. Therefore, leaseholders have access prior to DNR. DNR must notify each packer by September 1 of its intent to purchase the shells, or else the packer can sell the shells to other customers for any lawful purpose.

Shells of oysters harvested in State but shipped out of State for shucking (to Virginia for example) are not required to be held for purchase by DNR. These shells are available on the open market from Virginia packers and are planted either by PRFC, Virginia private growers, VMRC, or at times by DNR and COE.

Shells of oysters harvested out of State, but imported and shucked in State, do not have to be held for DNR, though most of these shells end up on the same pile as the other shells so DNR gets them as well.

To implement the shell purchase program specified above, DNR sends a letter of intent to Maryland packers every year. Then DNR develops an allocation plan for the shells. Shells are either planted, stockpiled, delivered to hatcheries, provided to community groups, or combinations of the above.

Regulation 08.02.08.09 sets the prices paid to purchase fresh shells and to plant fresh shells. Privately owned boats under contract to DNR plant shells.

DNR POLICIES

DNR policies exist in order to assure that adequate supplies of fresh shells are available for the hatchery effort and other restoration projects. The policies have been in effect for about four years (as of 1998 and need to check for updates) and are:

Hatchery Priority – Shells are made available to hatcheries over any other use. When hatchery needs are made known, the shells are delivered or are held at the shucking houses, to be delivered later. DNR has never charged Horn Point for the shells or the

transportation costs because it is a positive partnership arrangement. But if shell volumes and transport distances increase drastically beyond recent levels, this will strain DNR's limited budget and billing Horn Point will be considered.

Community/Environmental Group Priority – Any community or environmental group can acquire shells. DNR requires that the shells be wisely used in a credible project, which is reviewed by DNR, and on the proper bottom which must be approved by DNR. DNR requires that grants or the group pay for both the shells and the planting costs as a show of good faith that the project is a true partnership and since these outside funds alleviate DNR's tight budget from the expense.

Stockpiling by DNR – If a processor has adequate on-site storage space, if there is adequate storage space nearby, or if the volume of shells produced by a packer each year is small, DNR will stockpile those shells and plant them every two years. Planting every two years makes logistical and economical sense. Planting every two years reduces overtime, travel, and trucking expenses for DNR.

By planting every two years, aged shells can easily be made available to the hatcheries, since a portion of the stockpiled shells are over one year old. Even if aged shells are not immediately on hand at the packing houses, un-aged fresh shells can be delivered to the hatcheries for aging on site.

Leaseholders – Leaseholders can obtain fresh shells directly from the packer. DNR is not involved in the negotiations. The packer is not obligated to hold shells for DNR if the shells are used on private bottom. The leaseholder and the packer should inform DNR of the purchase to document that the sale was within the law. DNR supports the improvement of private bottom.

Maryland Shells in Virginia – Maryland oysters shipped to Virginia for shucking result in large stockpiles of shells in Virginia. These shells are not required by law to be returned to Maryland, though a Maryland shipper or environmental organization could contract with the Virginia packer in a business arrangement to bring shells back to Maryland. DNR has at times purchased shells from Virginia packers via the PRFC for planting in southern Maryland. The logic is the Virginia shells somewhat compensate for the fresh shells in southern Maryland that now go to the hatchery effort instead of being planted on public bars. These types of purchases are limited due to the high cost of buying and shipping the shells.

Issue: Current supplies of fresh shell are adequate for leaseholders because there is very little current demand. However, if demand increases, this could be a problem.

Recommendations:

1. Remove the limitation using market principles or allocate a significant portion to the leaseholders (4-1103(e).
2. County-based seed production initiatives that use shells planted by DNR funds should allocate some percentage of seed for sale to leaseholders.

3. Increase seed production by increased effort and increasing acreage available and expanding acreage available and areas used for leasing.
4. Develop a strategy to assure that adequate shell supplies will be available if leasehold demand for shell increases. This may be difficult in the short-term with fewer shucking houses each year.

4.0 FINFISH AQUACULTURE FOR HUMAN CONSUMPTION

There is an Aquaculture Plan from the Aquaculture Advisory Committee. A component of this Aquaculture Plan is the Fish Health Plan. This plan sets control procedures for importation of fish into the State to prevent the spread of disease to the natural environment.

Issue: Are these control procedures too strict?

4.1 On-Shore Finfish Aquaculture

4.1.1 Ponds

4.1.2 Closed or recirculating systems

4.1.3 Flow through systems

4.2 Off-Shore (Pen) Finfish Aquaculture

Although a significant industry elsewhere, off-shore finfish aquaculture is not currently a significant industry in Maryland. There are environmental issues associated with this type of aquaculture, and it would be helpful to address these issues prior to establishment of the industry to remove some of the uncertainty and delays that occur when an industry develops ahead of the regulations for that industry. The key issues generally relate to discharges that occur below the net pens from uneaten food and feces that create biological oxygen demand degrading water quality. A secondary concern is the release of antibiotics or their metabolites that may be necessary to prevent disease when fish are grown in high densities. Issues relating to the use of non-native species will be addressed in that section. Current laws provide no detailed provision for pen aquaculture in coastal waters. Navigation, multiple uses, would produce controversy. Process and federal interaction not fully established. An additional concern is the escape of cultured fish that interbred with natural genetic pools.

EPA proposing new regulations for aquaculture operations that may provide more stringent restrictions.
Request Andy Lazur to expand and provide more detail on his issues (in particular "excessive health requirements for imported fish.") (What innovations were tried that were prevented?")
Get copy of DNR comments on new EPA promulgation.

5.0 NON-FINFISH OR SHELLFISH AQUACULTURE (E.G., PLANTS) FOR ORNAMENTAL OR RESTORATION USE.

5.1 Operation size and location requiring wetlands license. The agencies have distinguished between those needing a permit and those that don't. The industry feels that the current size restrictions need to be expanded. Would like an exemption from the wetlands license if within a certain distance of the pier. Current law essentially requires them to be under the pier. [This should probably be moved to the aquaculture section.]

12a) Need clarified process and timeline. Allow use of external data. Jill: would need to be on a case-by-case. Might need peer review. Rich: need QA/QC data; how to demonstrate sterility. "State" said not safe to have grass carp, and refused to consider alternatives.

Possible nuisance species legislation may, in part, address this. Bill considers aquaculture situations.

6.0 PROCESS AND PROCEDURAL ISSUES

Recommendation: Need to have one contact agency or body for regulatory assistance and decision-making; this could be a review or control board. An Aquaculture Review Council or an Interagency Coordinating Council are examples that have been used elsewhere. A timeline for response and final disposition should be required of this body.

6.1 What are the competing interests of different agencies affecting the aquaculture industry?

Other desired uses may compete with the desire to use State resources for aquaculture. This raises questions regarding public use of resources, e.g., for general recreation open to all vs. exclusive use by a commercial entity. Property rights of adjacent property owners may also need to be considered and include traffic resulting from a commercial operation and esthetic impairment of a view.

6.1.1 Maryland Department of Agriculture

MDA is the focal point for the industry for promotion and information but doesn't talk to other agencies about regulatory concerns. This role needs to be better defined.

Recommendation: need to incorporate regulatory assistance in MDA's portfolio.

6.1.2 Department of the Environment

MDE has a dual role with respect to shellfish aquaculture. One concern is water quality that is safe for harvesting oysters and consistent with the requirements of the National Shellfish Sanitation Program. This public health concern addressed by water monitoring and certifying areas as being safe for shellfish harvesting. This public health concern is shared with the Department of Health and Mental Hygiene which takes over responsibility for shellfish related health issues after the shellfish leave the water.

The second MDE focus is related to wetland use and the issuance of wetlands licenses and permits. This responsibility is shared with the Board of Public Works and the US Army Corps of Engineers. The key issues are to assure that waters remain open and safe for navigation, and that use of State waters for private purposes is appropriate.

Issue: It takes too long to obtain the appropriate permissions.

Recommendation: the State agencies and the industry should determine the size or location limits that will not require a wetlands license.

6.1.3 Department of Health and Mental Hygiene

As noted above, DHMH has the responsibility to assure public health once the shellfish leave the water. This includes review of Hazard Analysis and Critical Control Point (HACCP) plans, issuance of shippers' licenses and inspection of holding and storage conditions. The laboratory at DHMH also conducts the analyses for fecal coliform bacteria used by MDE to determine whether waters should be certified for harvest. As mandated by law, DHMH also issues Food Processing Plant licenses and Interstate Shellfish Shippers which provides certification to ship interstate. These licenses provide health protection that also protect the market.

6.1.4 Department of Natural Resources

DNR is authorized to issue aquaculture permits, manages the fishery and leased bottom, and conducts the oyster replenishment program. The main purposes of the aquaculture permit is to register people, assure against use of nonnative species that may interact negatively with native fishers and prevent the spread of fish or shellfish diseases (Bohn, personal communication Sept. 16, 2003).

Issue: Aquaculture permits, which primarily address issues of health seed stock and non-native species need to be better coordinated with other permitting and regulatory actions.

6.1.5 US Food and Drug Administration

The FDA provides federal oversight of State programs and audits the programs annually. FDA works with States through the Interstate Shellfish Sanitation Commission to review and revise the model ordinance that underlies the National Shellfish Sanitation Program.

6.2 Standardized appeals process.

Florida has consolidated in a single agency with standardized rules and processes. Need to be able to get a resolution, yes or no, within a specified time frame. In some States the Department of Agriculture acts as an arbiter to help resolve such disagreements.

Recommendation: There should be a standardized appeals process if a regulated party disagrees with an agency position.

6.3 Submission of external data to the regulatory process

Recommendation: Agencies should establish procedures in advance for what data will be accepted as part of the regulatory decision making process. These procedures could include peer review and publication of data, submission of quality assurance/quality control procedures and data, or other types of quality assurance.

Case example: A non-native species was uniformly banned and data was not accepted to show that the fish were sterile and could not reproduce even if they escaped confinement.

6.4 Regulations do not allow for innovation (from Andy Lazur – need to get an expansion on this).

7.0 GENERAL REGULATORY TREATMENT OF THE INDUSTRY

7.1 Aquaculture should be treated as agriculture.

Same tax breaks and heritage programs should apply to aquaculture. Federal-State consistency. [Need more detail on exactly what is desired.]
A situation was raised with respect to a hatchery that needed to have a discharge permit. Need to clarify whether the same situation holds for on-shore aquaculture or ornamentals.

Recommendation: Explore legislative fix to level the playing field with respect aquaculture being treated like agriculture.

7.2 Aquacultured fish clearly not suitable for consumption should not be subject to the same requirements as fish raised for food (in relation to the use of therapeutics).

To disallow an entire market because someone might make a mistake is not appropriate. The potential for abuse is not an argument against proper use.

7.2.1 These products should be differentiated at federal levels. Therapeutic chemical restrictions are blanket. Need to get species specific exemption.

7.2.2 Proper controls are needed to allow food oysters and nutrient removal oysters to coexist without undue concern that nutrient removal oysters get to market.

Recommendation: Request federal delegation to help with correcting food vs nonfood fish and therapeutic chemical.

7.3 Regulations do not allow for innovation. (Get examples from Lazur).

7.4 Complexity of application and time required is excessive. (Lazur – Need specific examples and illustrations)

Bob Parkinson says that unless agencies have questions it is not that complicated.

Possible recommendation: Develop enforceable best management practices to guide the industry (e.g., Florida)

7.5 (moved to lease section)

8.0 RESEARCH NEEDS

8.1 Clearing rates for shellfish at different temperatures

Invasive species?

- National level
- Other States

ACTION: What is the federal gov't doing?

Discuss issues identified on Jan 2 in more detail.

Industry perception is that State government enforcement and regulation suffocated the industry. Perception vs reality could be an issue

Fish kill near Thurmont- near hatchery at Hunting Creek was given as a case example. Chip will pursue other illustrative cases.

Recommendation: Some sort of training or education is a definite recommendation from the group. Involve extension service.

Finfish issues from Lazur should be incorporated and mapped on the process.

Cull size: oysters less than harvest size, that can be retained for a short period on a boat for sorting before being returned to the water.

National Shellfish Sanitation Program (NSSP): The program run by the US Food and Drug Administration, in cooperation with the coastal states to develop rules and procedures guiding the States' shellfish programs.

Relay: The transfer of oysters from an area not suitable for harvest (e.g., restricted) to an area of clean water where they can naturally cleanse themselves and be harvested after a certain period. Relay can occur only when water temperature exceeds 50°F to assure that they are actively feeding and moving the clean water through their system.

Appendix 1: 2003 Procedure for the relaying of off-bottom cultured shellstock for the purpose of natural cleansing (draft).

Draft: 2003 PROCEDURE FOR THE
RELAYING OF OFF-BOTTOM CULTURED SHELLSTOCK FOR THE PURPOSE OF NATURAL CLEANSING

These procedures are to be used only for the purpose of relaying oysters currently deployed in St. Thomas, St. Inigoes, Harper, Pearson and Goose Creeks. This procedure may only be used to relay shellstock grown off-bottom from areas where the owner has:

A) Applied for and received a permit under the Joint Federal/State Application for the Alteration of any Tidal Wetland in Maryland;
B) An Aquaculture Permit issued by the Maryland Department of Natural Resources; and
C) Complied with all terms and conditions set forth in these permits.

Oysters transplanted from a polluted to a clean environment will cleanse themselves of bacteria and viruses. This cleansing ability is a phenomenon of the shellfish feeding process. The time required for natural cleansing of oysters grown off-bottom has not been tested and is influenced by many factors including the original level of pollution, water temperature, salinity, and the physiological activity of the oysters. It is reasonable to use the 14-day time period, which is an accepted practice for natural bottom harvesting under the National Shellfish Sanitation Program. To protect public health, the following procedures are established for the 2003 relay season only. Future procedures are currently being reviewed and are yet to be determined.

Conditions Required for Relay of Off-Bottom Aquacultured Oysters:

The proposed relay operation is permissible under Maryland Code Annotated, Natural Resources (Natural Resources)§§4-742 and 4-1006 provided that the following conditions, procedures, and requirements are met before, during and after the relay operation.

1. Relay operations are only permitted during the closed season for natural oyster bar harvest as set forth in Natural Resources §4-1008.

2. All sites with a valid aquaculture permit shall be staked at all four corners of the site, stakes shall be maintained at all times and marked with the owner's aquaculture permit number (Natural Resources §4-11A-10). In addition, each float shall be conspicuously marked with each individual's aquaculture permit number. This includes all permitted sites and floats in Harper, Pearson, and Goose Creeks, St. Thomas Creek, St. Jerome Creek, and St. Inigoes Creek.
3. The entire relay operation is to be carried out under the supervision of a State Shellfish Control Authority (DNR or DHMH). Staff from DHMH will oversee the removal and follow the truck when the oyster bags are removed

from the restricted areas and transported overland to the transplant site known as Section 2 in St. Jerome Creek. During transport, all vehicles shall fly a yellow flag. At least seven days notice to both DHMH and DNR is required prior to scheduling the relay.

4. Before any oysters are moved and during the relaying operation, the transplant area, shown in Attachment 1 and identified as Section 2, located in St. Jerome Creek, shall be conspicuously marked by yellow flags attached to fixed buoys or stakes. The flags shall be two feet by three feet. This area shall be considered closed due to pollution, in accordance with Natural Resources, §4-1006, while the yellow flags are in place.

5. Oysters not subject to relay may not be grown or stored in Section 2 in St. Jerome Creek while the relay operation is in progress. Oyster bags that are already in Section 2 shall be removed prior to the start of the relay operation and once the yellow flags are in place. The entire area, known as Section 2, will be considered restricted until a letter from MDE gives permission to remove the yellow flags.

6. Once a written request to relay is received, MDE shall review water quality in St. Jerome Creek to ascertain it is of acceptable quality, including a review of sanitary survey information, monitoring data, and water temperature.

Procedures:

1. Each applicant shall make request in writing to the Maryland Department of Environment for permission to relay each time a relay is requested.

2. The letter of application shall specify:
   - Name, address, phone number, and aquaculture permit # (for the site the oysters are coming from) of each applicant.
   - The number of oyster bags to be relayed and the approximate beginning and ending date of the relay operation.
   - The applicant shall obtain a letter from the licensed shellstock shipper giving him permission to use his site for relay. The letter shall include the aquaculture permit # of the site the oysters are going to and the receiving dealer's Shellstock Shipper license/certification number issued by DHMH This written procedure shall be included in the approved HACCP plan. The letter shall also include the information that will be used on the shipping tag to identify the product when it is offered for sale (such as MD St. Jerome Creek #266).

3. The yellow flags, specified above, will remain in place until written permission is received from MDE to harvest.
4. The MNRP may patrol the transplant area marked by the yellow flags while on normal, routine, patrols until permission to harvest is given by MDE.

5. Oysters will be removed from the restricted area in the oyster production growing bag. Upon removal from the water, each bag shall be sealed by DHMH. After the bags are counted and sealed, they will be moved to the relay site and re-deployed in these unopened bags. DHMH shall record the count and seal numbers and provide this record to MDE and MNRP. The floats shall be marked with the aquaculture permit number of the site from which the oysters were removed. The oysters shall be retained with seals untouched in their original growing bags for the entire relay operation.
6. The transplanted oysters shall remain overboard until the oysters have been tested by MDE, found satisfactory, and written approval to harvest is given. MDE will test the oysters only after:

   a) MDE has been notified when the last oyster was transplanted and how many oyster bags were relayed; and
   b) The oysters have been overboard in the transplant area a minimum of 14 consecutive days. The 14-day period begins once the last oyster is moved to the relay site. The fourteen days is suspended for the time period St. Jerome Creek is subject to a conditional closure and the count shall begin again, where it left off, once the conditional closure is lifted.

7. Once permission to remove the yellow flags is received, DHMH will observe the removal of the seals and the oysters can be harvested unless St. Jerome Creek is subject to a conditional closure. Immediately upon the sale of the relayed shellstock the applicant shall notify MDE by providing a written record of the buyer, the amount bought, and the date of sale.

Appendix 2: Off-bottom aquaculture permitting guidelines

Draft September 26, 2002

OFF BOTTOM AQUACULTURE PERMITTING GUIDELINES

NON-HUMAN CONSUMPTION/ NON COMMERCIAL

A) Aquaculture projects of less than or equal to 100 square feet of floats and located beneath and/or within three feet of a pier.	Exempted from Aquaculture Permit and Tidal Wetlands License (Natural Resources Art. 4-11A-16. *(Develop a non reporting general permit with the Corps)*
B) Aquaculture projects greater than 100 square feet but less than 500 square feet and for the purpose of scientific research.	Requires a Tidal Wetlands License from the Board of Public Works and a $50.00 fee. Must obtain an Aquaculture Permit. Requires Army Corp of Engineers' authorization.

HUMAN CONSUMPTION/ COMMERCIAL

C) Aquaculture projects greater than 100 square feet and less than 5000 square feet. *Note: No project less than 100 square feet shall be authorized.*	Requires a Tidal Wetlands License from the Board of Public Works and a $500.00 fee. Must obtain an Aquaculture Permit. Requires Army Corp of Engineers' authorization
D) Aquaculture projects greater than 5000 square feet.	Requires as stated in"C" and also a Water Column Lease with the Board of Public Works which has an annual fee of $80.00/acre/year.

*** This workgroup was disbanded by Senator Klausmeier. The work will be continued under the authority of the proposed Aquaculture Review Board.**